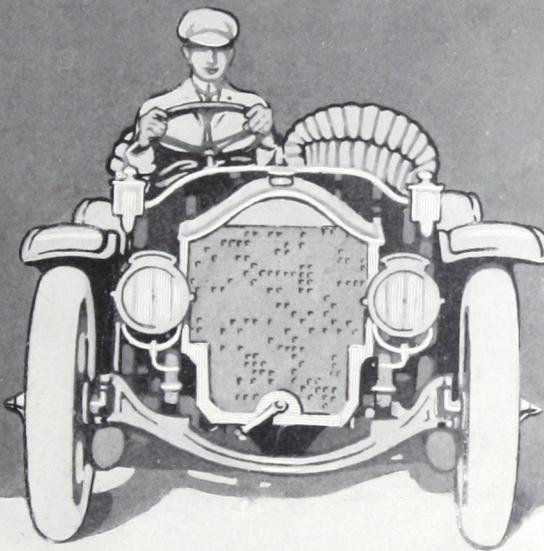


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CONCRETE GARAGES



PUBLISHED BY

THE ATLAS PORTLAND CEMENT CO.
30 BROAD ST., NEW YORK

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CONCRETE GARAGES

THE FIREPROOF HOME
FOR THE AUTOMOBILE

PUBLISHED BY
THE ATLAS PORTLAND CEMENT COMPANY
30 BROAD STREET
NEW YORK

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Second Edition



Garage at West Brighton, S. I. Solid Reinforced Concrete.

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CONCRETE GARAGES

With the advent of the automobile and its growing popularity, especially among the people living in suburban towns, there has come a demand for a new class of building—the private garage. The necessary storage of oils, gasoline and other combustible materials, makes the garage a veritable fire-trap, unless a fireproof building is erected.

Concrete, by reason of its adaptability to varying conditions, is the cheapest satisfactory fireproof building material, and the absurdity of storing a valuable automobile in a building liable to burn at any moment, when, for a small difference in price, a fraction of the cost of the automobile, a fireproof building can be built, is readily apparent.

Many automobile owners have realized this situation, and the illustrations in this book show a few simple designs in concrete garages which have been built for the proper housing of automobiles and the protection of the property.

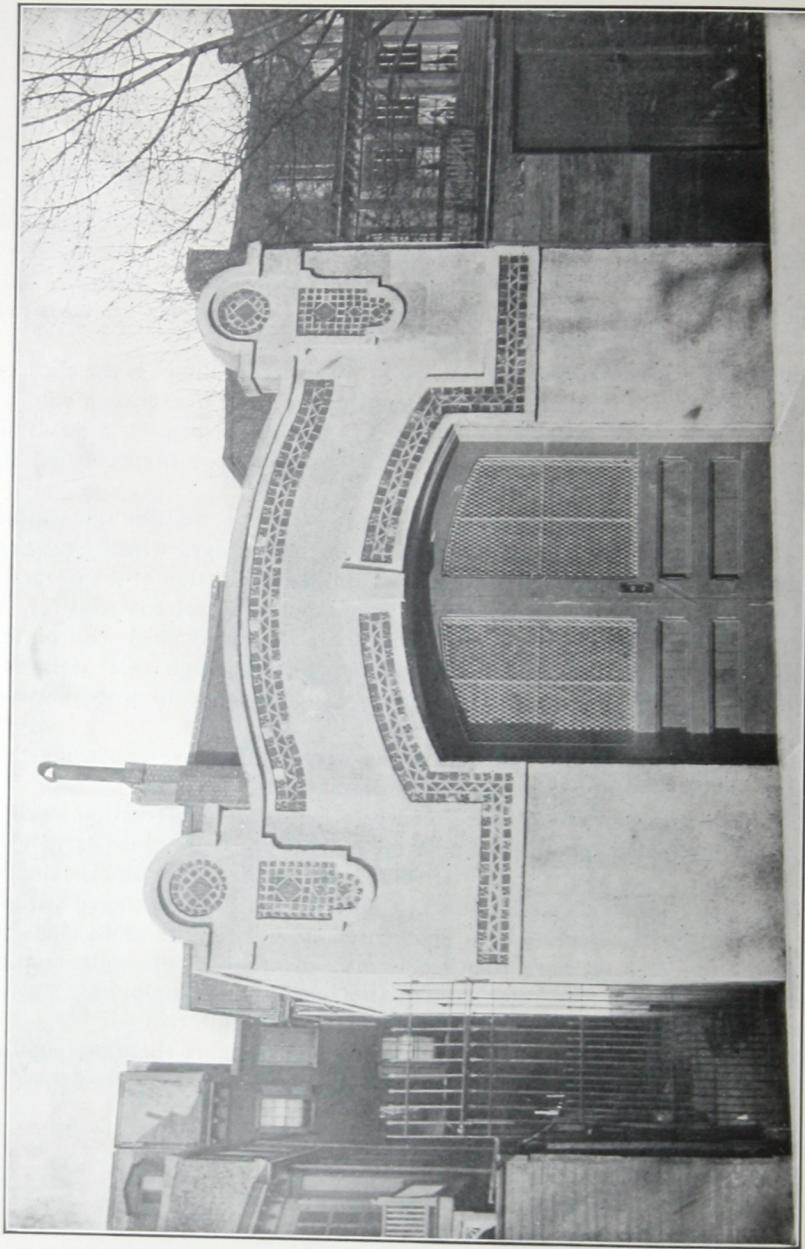
It is hardly necessary to say that wood is not a proper material for the construction of garages. Moreover, wood floors become soaked with oil and quickly rot tires. Aside from being inflammable, the high cost of lumber and of the skilled labor necessary renders the difference in price between wood and concrete a negligible quantity.

Brick work and masonry are as a rule very much more expensive than concrete, while offering no additional advantages.

There are several ways of using concrete in garage construction, each of which will give good results, the best methods being determined largely by local conditions, such as the supply of skilled or unskilled labor and the quality of material to be had. Simple one-story garages can be constructed without difficulty under the direction of a good foreman, but for the more elaborate buildings and those of more than one story, an architect or engineer thoroughly familiar with concrete construction should be employed. This is essential when reinforced concrete floors are to be built.

The following methods of building concrete garages are the most popular, and used either singly or in combination will give satisfactory results.

- 1.—Mass or reinforced concrete.
- 2.—Concrete hollow tile.
- 3.—Concrete block.
- 4.—Pipe frame with wire lath and stucco.
- 5.—Wood stud frame and stucco.



Garage at Philadelphia, Pa. Solid Reinforced Concrete.

GENERAL DIRECTIONS.

*The selection of materials for building with concrete should be carefully undertaken, as without the best material a first class job cannot be expected.

These brief rules should always be kept in mind: 1st—Use clean coarse sand, broken stone or clean screened gravel and Atlas Portland Cement. 2d—Make sure the concrete is thoroughly mixed. 3d—That sufficient water is added to produce a mushy mixture. 4th—The concrete is used before it gets its initial set—the result will be a hard, dense concrete.

The selection of the aggregate (sand and broken stone or gravel) will play an important part in the appearance of the finished work, and where a particular shade or color is desired, it is recommended that a sample batch of concrete be made, using exactly the material that is to be used in the work.

Atlas Portland Cement is particularly light in color, and, therefore, peculiarly adapted to obtaining beautiful effects.

MASS OR REINFORCED CONCRETE CONSTRUCTION.

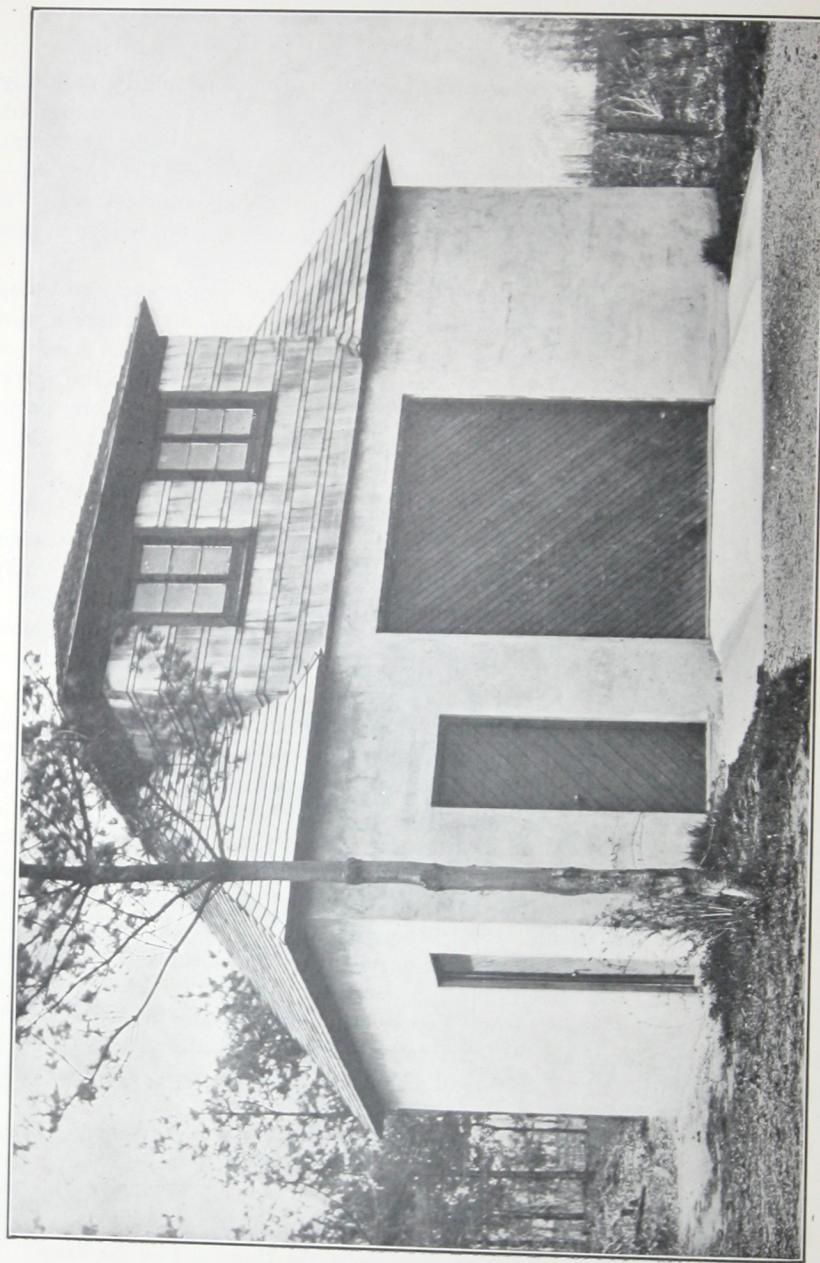
Mass concrete, by which is meant solid concrete, built in place between temporary wooden forms, is a most durable and substantial type. Floors may be built of the same material, but must be properly reinforced with steel.

In preparing the footing for a garage, excavate a trench to the depth below the frost line, six inches wider than the proposed wall, and fill to within 8 inches of the ground level with concrete—1 part Atlas Portland Cement, 3 parts clean coarse sand, 6 parts broken stone or gravel. After the concrete is sufficiently hard to withstand the weight build the forms for the proposed wall in the center of the footing and fill with concrete—1 part Atlas Portland Cement, 2 parts clean coarse sand, 4 parts broken stone or gravel—using a stable or coal fork to work the large pieces of aggregate away from the surface, letting the mortar and fine material through so as to make a dense, smooth, hard surface. The forms for the walls may be taken off in 48 hours in warm weather, but should remain longer if the weather is cool. In cold weather concrete may be handled with excellent results, but all material must be heated, including the cement and the water, to fully 80 degrees, and as soon as deposited must be covered and kept warm until thoroughly set. In hot weather concrete should be kept covered, sheltered from the sun as much as possible and continually wet down. You cannot give concrete too much water after it has set.

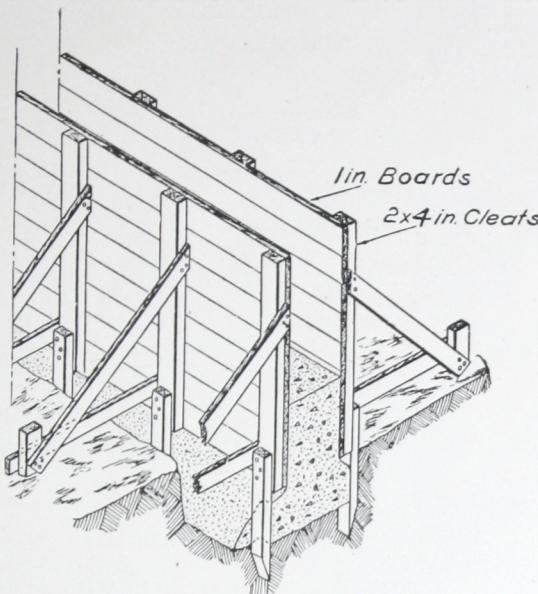
For a one-story garage, the walls need not be over 8 inches thick. For a

*For detailed information as to the selection of materials and the methods of mixing and depositing concrete, see our "Concrete Construction About the Home and on the Farm," free upon request.

†See forms p. 19—"Concrete Construction About the Home and on the Farm."



Garage at White Plains, N. Y. Solid Reinforced Concrete.



Forms for Mass Concrete.

two-story building make the first story 10 inches thick and the second story 8 inches thick. After the forms are in place, it is desirable to smear the inner surface with petroleum (crude vaseline), soft soap or other similar material. After the forms are removed and before the surface of the concrete has dried out, the board marks should be removed by rubbing the surface with carborundum brick and washing down with clean water. This method is superior to applying a wash of any kind. A piece of hard sandstone will do for this rubbing, but the carborundum will work faster and cut cleaner.

For mouldings, panels, projections or recesses corresponding moulds should be made in wood and set up rigidly with the wooden form work and filled simultaneously with the rest of the walls. It is best to fill entire sections of the wall in one operation, stopping only at a moulding or other horizontal line, as it is difficult to bond concrete masses and the line of cleavage or demarcation between masses of concrete deposited at different times is likely to show permanently. If a wall is to be stuccoed, it would be desirable to reduce the quantity of the sand and allow more or less honey-combing to appear on the surface of the work to give an additional bond to the mortar, and it is desirable to wait a month or so after the concrete has been poured before the stucco is applied to a concrete wall.



Garage at Paterson, N. J. Solid Reinforced Concrete.

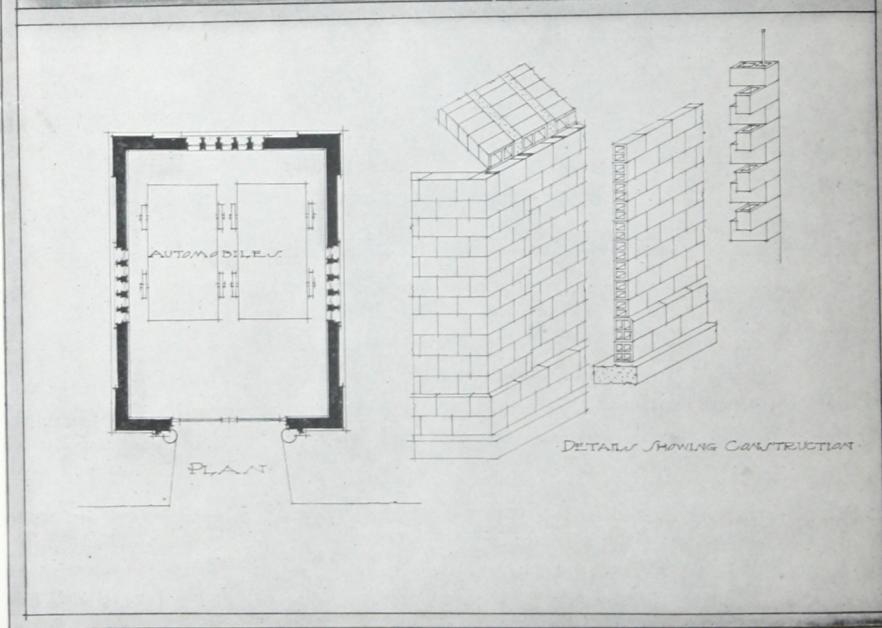
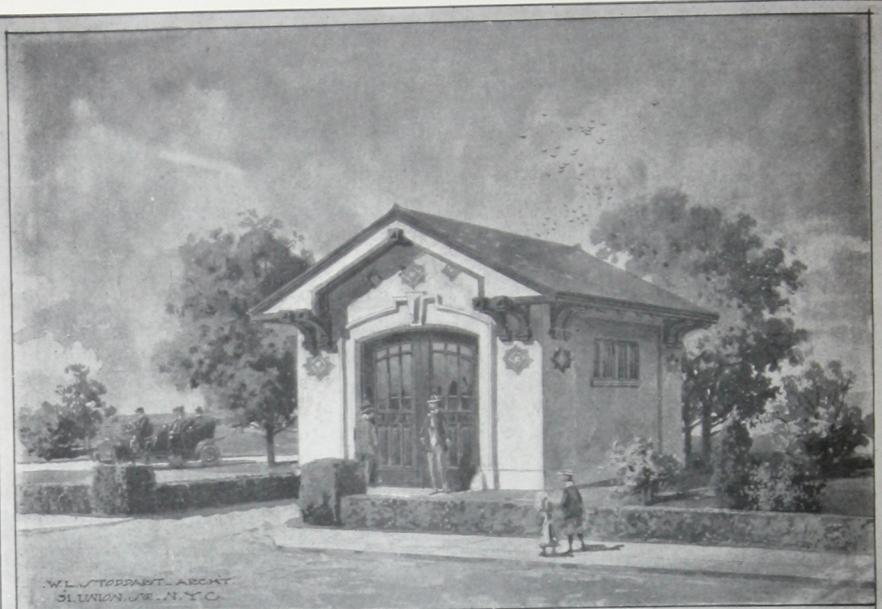
A good combination will be found to be a skeleton of reinforced concrete with piers from 16 ft. to 18 ft. apart, with the panel between the piers made of concrete blocks or tile. The panel wall may be made of solid concrete, the same as the piers, but a more attractive looking building and a more economical construction can be obtained by the first method. If more elaborate effects are desired, much can be done by using facing of fine material of crushed granite or marble, Atlas Portland Cement, and carefully selected



Garage at Beverly Farms, Mass. Solid Concrete.

sand, and after the concrete has reached a proper hardness, tooling the face so as to bring out the texture of the facing mixture. Stonecutters' tools are used for this purpose, and a great variety of effects may be secured by a judicious choice of material.

A sloping or hip roof is not easily managed in fireproof construction, and the safest and most economical scheme is to use a wood roof covered with slate, asbestos or tile and sealed on the under side with a metal lath and cement ceiling built in the same manner as the walls of the pipe frame garage described.



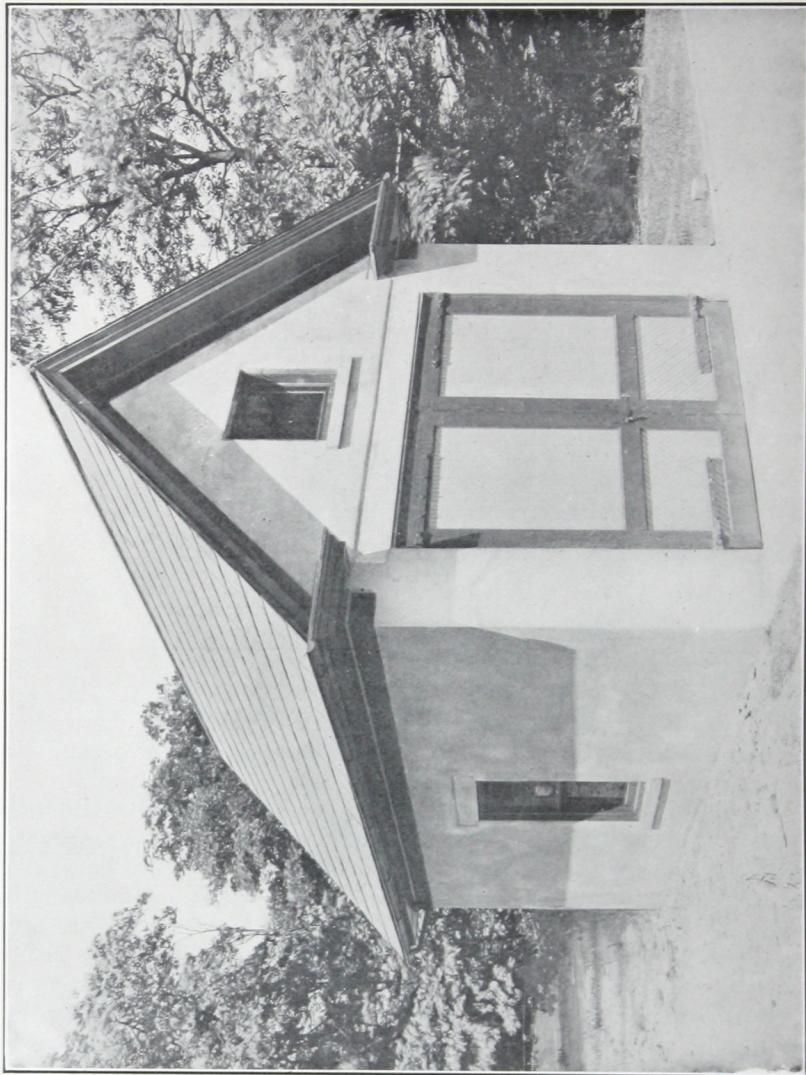
CONCRETE TILE CONSTRUCTION.

In various parts of the country concrete hollow tile are to be had which are exceedingly economical for wall building. They are made in various shapes and sizes and may be laid up by any brick mason rapidly and efficiently. The accompanying drawing will give some suggestion as to the method of laying these tile.



Garage at Far Rockaway, L. I. Stucco on Wood Stud and Metal Lath.

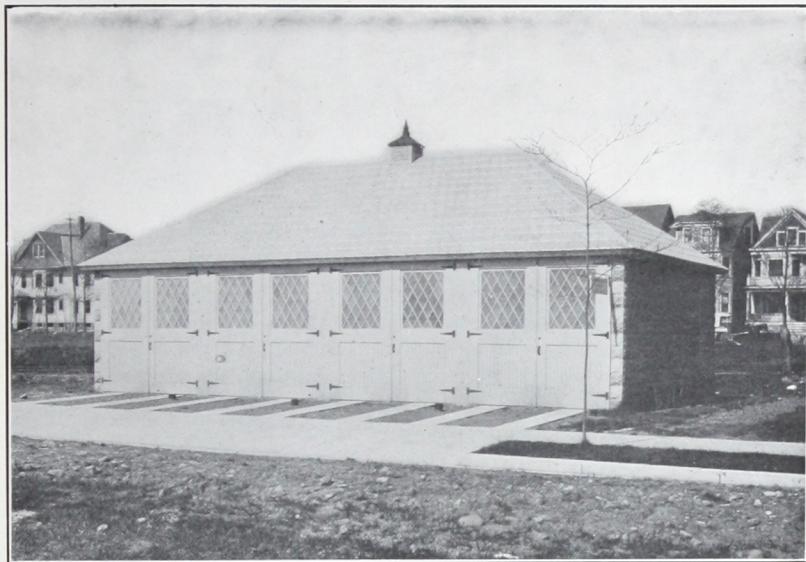
A footing should be laid extending 3 inches on each side of the proposed wall and from 8 inches to 10 inches in thickness. This footing should be carried down below frost line, as in mass construction. The tiles which are to be had usually 10 inches wide and 8 inches high, should be laid on top of this footing and carried up to ground level or above. If the load is not too heavy the smaller tile—6" x 8"—may be laid up for the rest of the wall. The tile shown in the drawing at the right are corner tile, with the cells running vertically instead of horizontally, and may be used in combination with the regular wall tile for the purpose of turning corners and working around doors and window jambs. If a two-story building is required it is advisable to fill the corner tiles with concrete and reinforce the piers thus formed with steel bars. It will also be found advisable to carry the 8" x 10" tile up to the level of the underside of the beams and use the smaller tile for the second story. A large



Garage at Youngstown, Ohio. Stucco on Concrete Tile.

amount of variation is possible with the use of concrete tile, which will readily suggest themselves to anyone desiring to build in this method. An excellent fireproof floor can be made by using the corner tile for floor fillers with concrete ribs between as indicated in the sketch.

*Stucco adheres readily to concrete tile walls, provided the wall is thor-



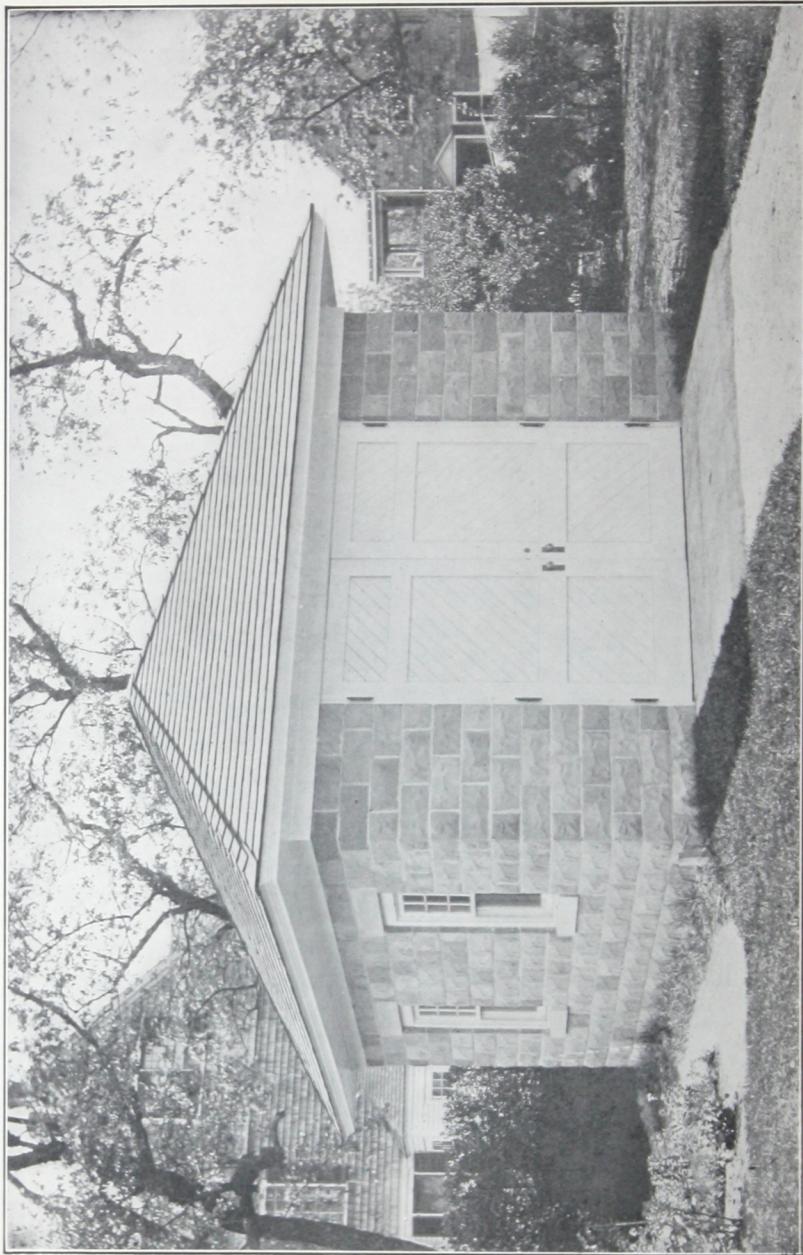
Garage at Paterson, N. J. Concrete Block.

oughly wet when the stucco is being applied. The stucco, being of the same material and having the same coefficient of expansion as the tile, does not crack, as is often the case when terra cotta tile is used.

CONCRETE BLOCK WALL CONSTRUCTION.

Concrete blocks differ from concrete tile in the method of manufacture. They are heavier and less economical than tile, but may be had in almost every locality, and if reasonably well made will do excellent service. They are generally made with rock face or finished surfaces and consequently do not require any surface treatment or stucco. There are many types of blocks on the market and there is little choice between them, although a wall made of two pieces is, as a rule, superior to a wall made of one piece, as these blocks are not as water-tight as wet mixed concrete, and the wall is likely to be damp

*See Method of Applying Stucco Under Pipe Frame, Wire Lath and Stucco.

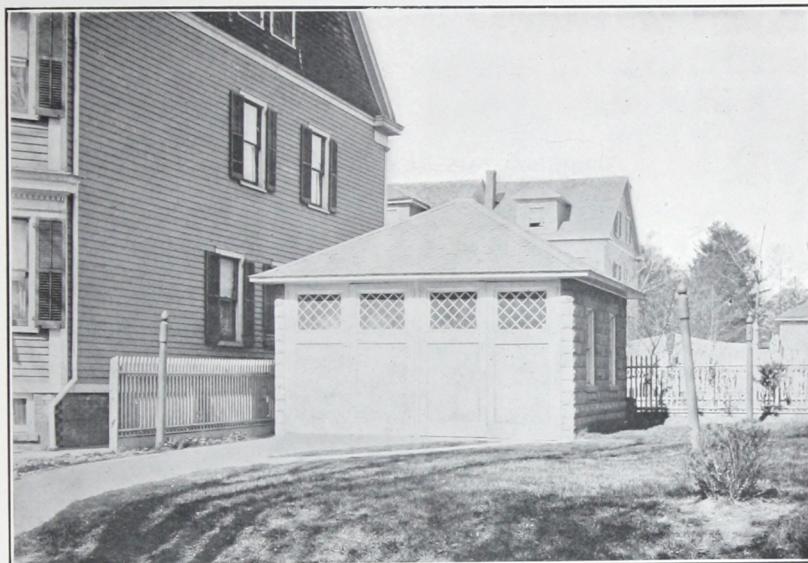


Garage at Far Rockaway, L. I., N. Y. Concrete Block.

if made of one-piece blocks. By using good facing material and a rich mixture, however, very good weatherproof blocks can be made. Sills and lintels may be cast in wooden forms to fit window and door openings.

Concrete blocks should be laid as cut stone and any good foreman is competent to superintend the work.

Garages of this construction are very often stuccoed, as will be seen by the illustrations.



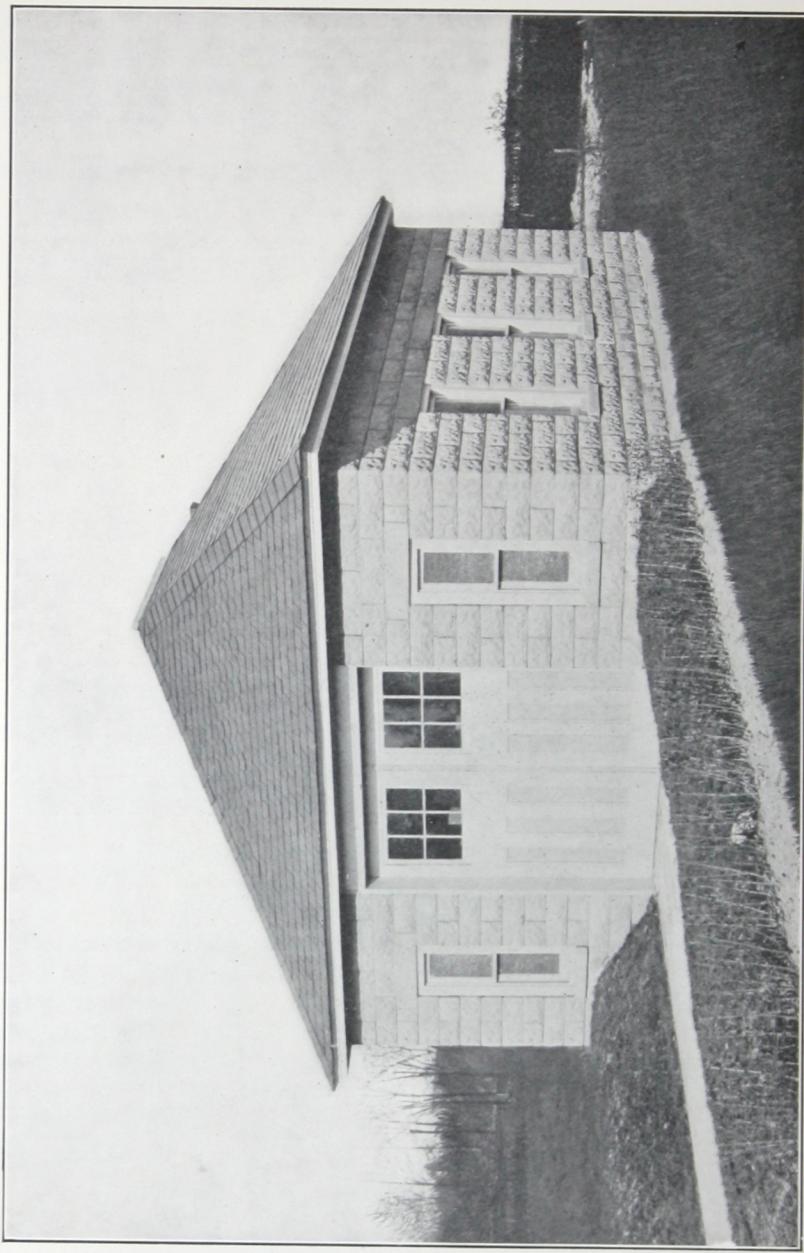
Garage at Paterson, N. J. Concrete Block.

PIPE WIRE LATH AND STUCCO.

This type of garage will be found very economical where material for concrete making is scarce, and where an owner does not want to go to the expense of solid construction. This construction consists of a frame work of pipe which can readily be had and is simply put together. The frame work is set in a base of concrete and the walls are covered with wire lath and mortar. The method is simple and at the same time is applicable to variation and decoration so as to meet all practical requirements and make an artistic structure.

FOOTING WALLS.

Excavate and build a footing wall from the surface of the ground to below



Garage at Paterson, N. J. Concrete Block.

frost line. Provide a footing under the wall 6 inches thick extending 3 inches on either side. The wall itself should be 12 inches thick, built between suitable plank forms. Mix the concrete for the wall and footing in the proportion of 1 part Atlas Portland Cement, 2 parts clean, coarse sand and 5 parts gravel or broken stone. Use sufficient water to make a soft concrete and puddle into place until forms are thoroughly filled, flush to the top.

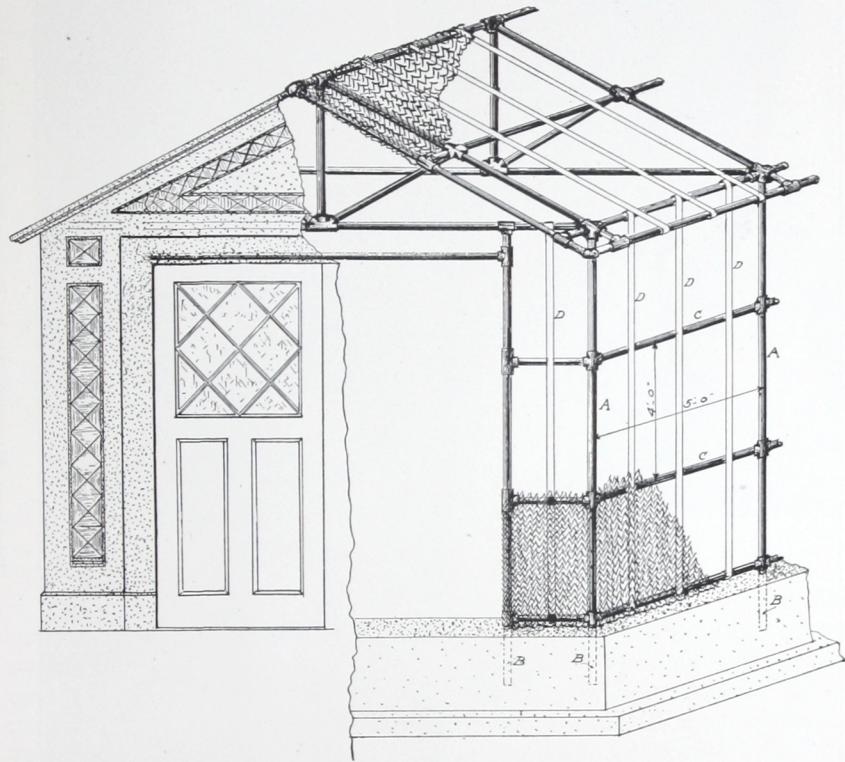
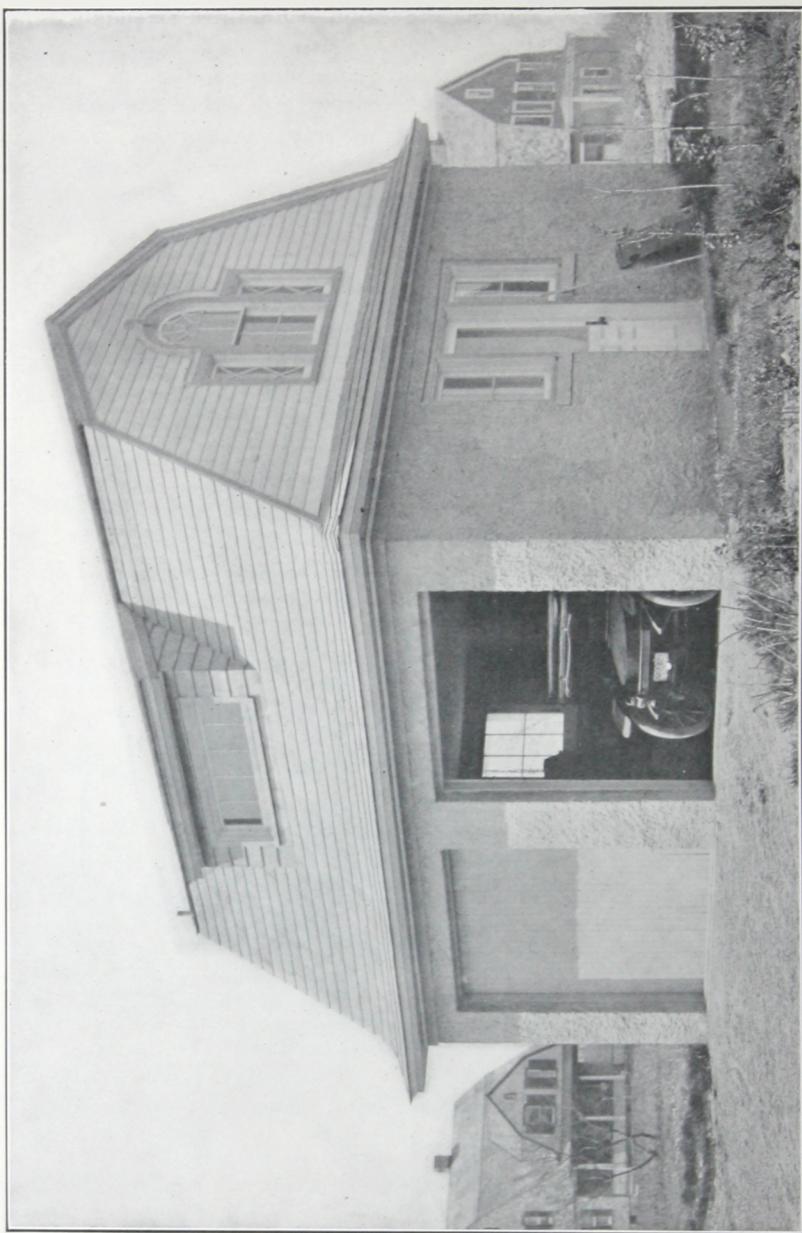


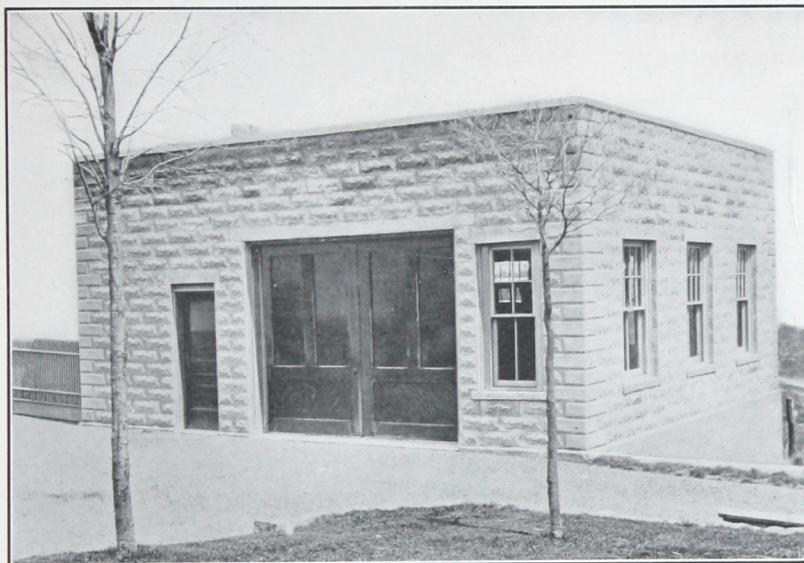
Diagram of Pipe Frame Garage.



Garage at Haworth, N. J. Stucco on Concrete Block.

PIPE DOWELS.

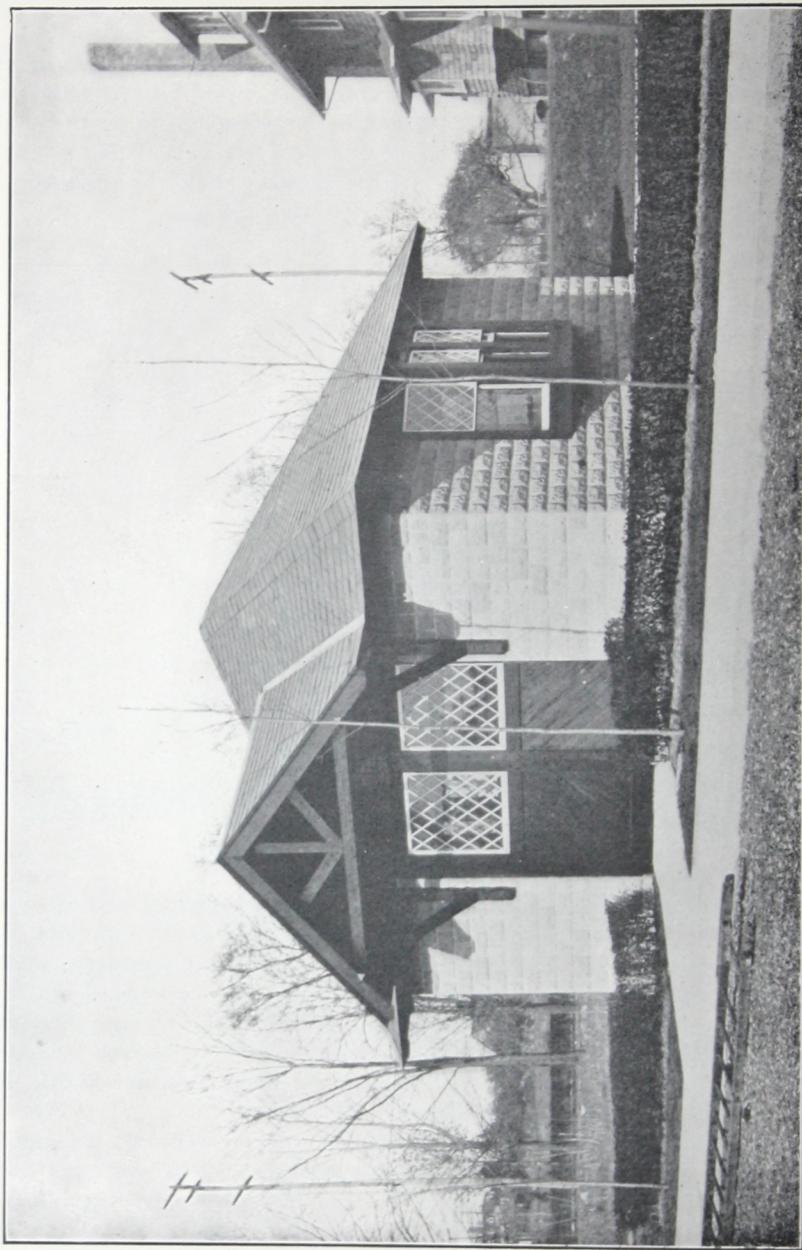
Before the concrete has set imbed along the center line of the wall pipe dowels 8 inches long, threaded to receive the standards AA. If angles are used in place of piping, the dowels should be large enough to let the angles down inside so that cement mortar made of 1 part Atlas Portland Cement to 2 parts of sand may be poured down into the dowels to hold the angles rigidly in place.



Garage at Scarsdale, N. Y. Concrete Block.

The frame should, of course, be laid out carefully on paper, and all dimensions determined. The local gasfitter or blacksmith can then get out main structural parts and assemble them, only light tools being necessary in either case. For a pipe frame use $2\frac{1}{2}$ -inch galvanized uprights, spaced not more than 5 feet on centers and $1\frac{1}{2}$ -inch galvanized horizontals about 4 feet apart. The frame, having been set up, fastens on the studs SS of $\frac{3}{4}$ -inch by $\frac{1}{4}$ -inch flatiron bent around the horizontal pipe and stretched well into place. The studs should not be more than 16 inches on centers.

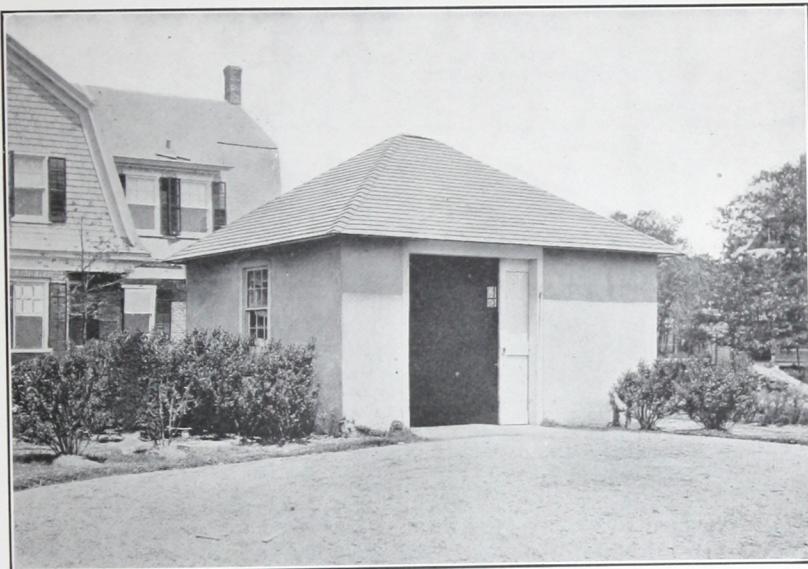
Metal lath should be laced to the studs DD, tied on well with No. 16 wire. There are a number of kinds of lath on the market, some of which are ribbed and provided with clips or fasteners to take the place of wiring. Any of these will do, but it is essential that the ratio of opening in the lath be large



Garage at Paterson, N. J. Concrete Block.

as compared with the area of metal. Wire mesh, expanded metals and the like are best for walls of this kind. Wherever the mortar is to be carried around the pipe frame, as at the edge of the eaves, carry the metal lath well around and wire firmly.

In pipe frame construction three coats of stucco will be required to make a good wall finishing about $1\frac{1}{2}$ inches thick; two coats being applied outside and one, a finishing coat, inside, a single layer of metal being used.

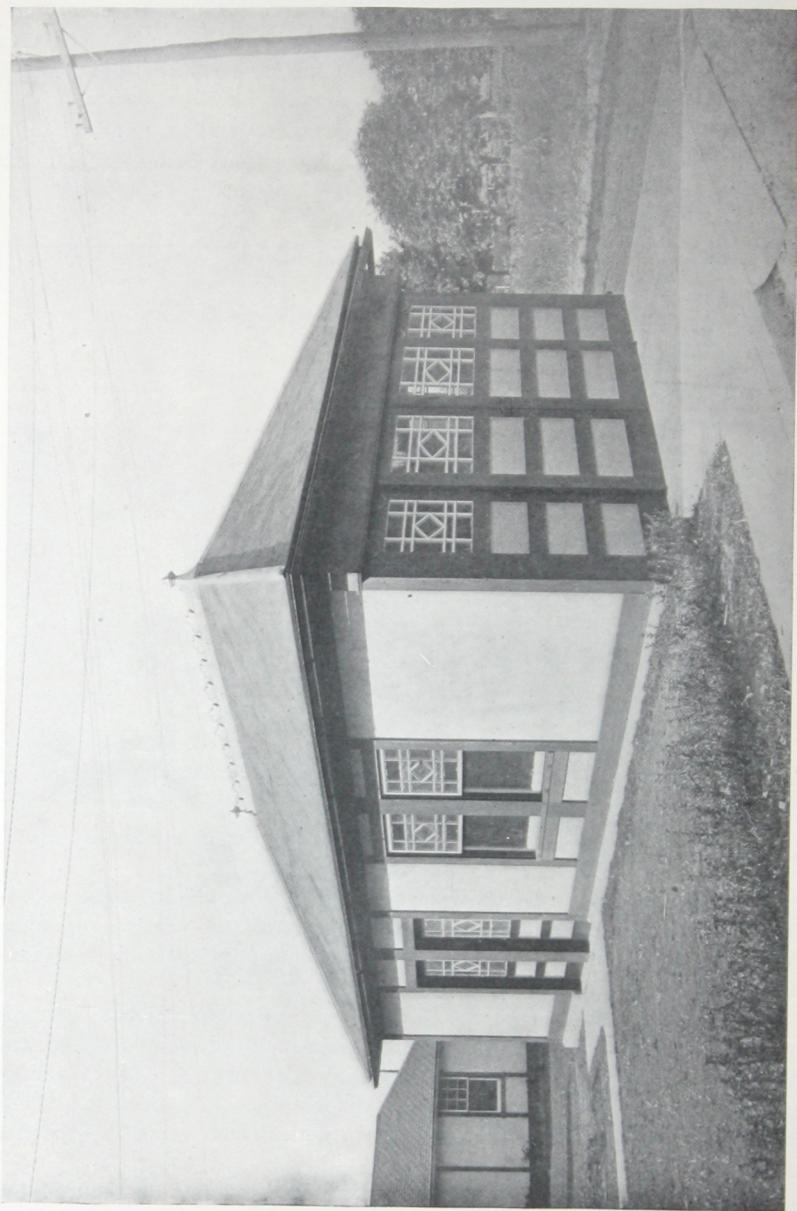


Garage at Woodmere, L. I. Stucco on Wood Frame and Metal Lath.

Small $1\frac{1}{2}$ -inch channel iron frames, punched with $1\frac{1}{4}$ -inch holes and provided with bolts, should be set around all door and window openings to receive a wooden buck to which the door or window frame may be fastened. This should be done before stucco is applied.

After the scratch coat (see specifications for stucco, p. 29) has been applied to roof and before second coat is put on, set 2-inch by 1-inch beveled wooden strips running parallel with the eaves and wire firmly. The spacing will depend on the kind of roofing to be used, whether slate, asbestos, tiles, etc. After the strips are set fill flush on the top with mortar mixed $2\frac{1}{2}$ parts sand to 1 part Atlas Portland Cement.

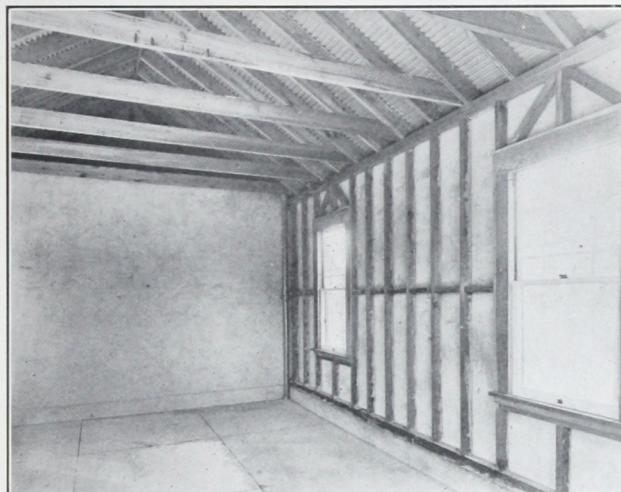
If desired many elaborate and beautiful effects may be secured by the introduction of panels or borders in tile, mosaic, or even pebbles and field



Garage at Allentown, Pa. Stucco on Wood Frame and Metal Lath.

stones. Frames of wood of required outline and thickness should be wired to the lathing and the stucco work finished. After the wall is hard remove the wooden frames carefully and fill the panels by grouting in the tile or other ornament, as desired.

Small angle iron may be substituted for the pipe frame, the angle irons being cut to the proper length, riveted together and set up in the same manner as for the pipe frame. The furring, metal lath, stucco, etc., will be applied in the same manner as described.



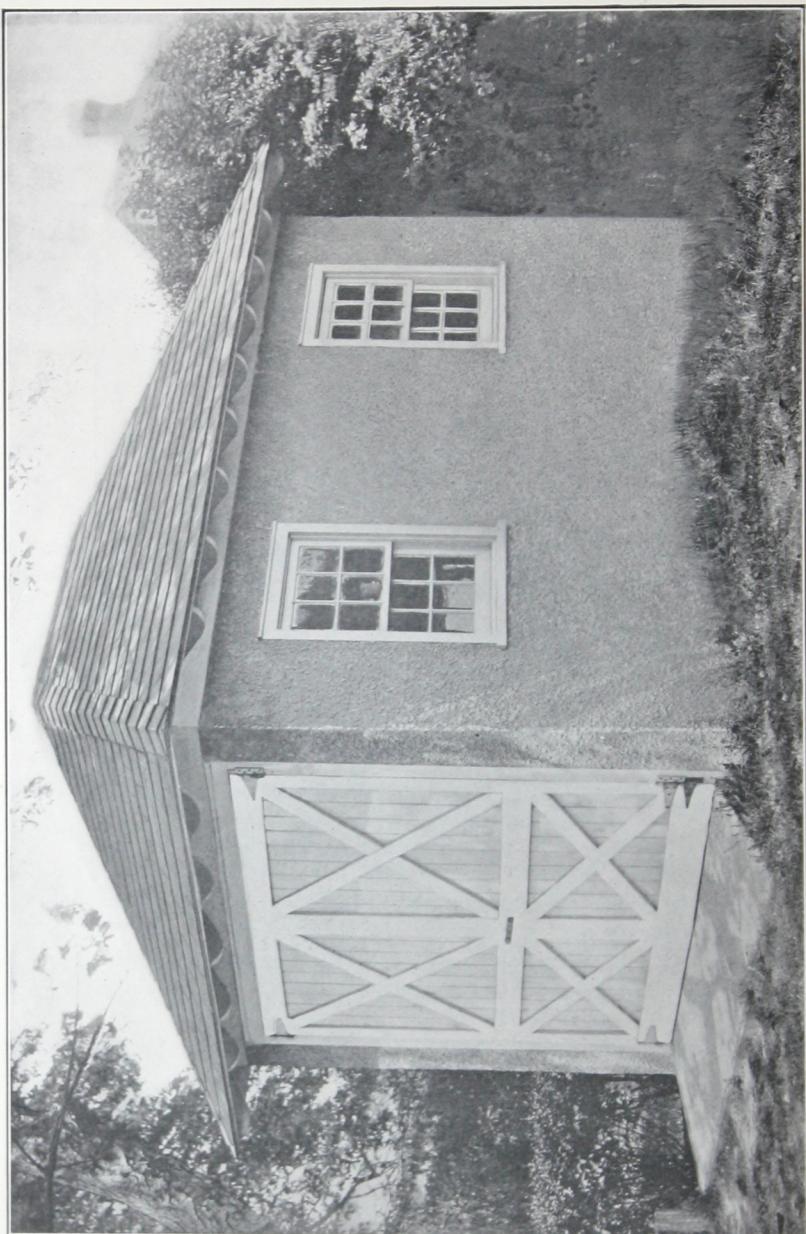
Interior of Garage at Allentown, Showing Wood Frame with Stucco on Both Sides of Metal Lath.

WOOD STUD FRAME AND STUCCO.

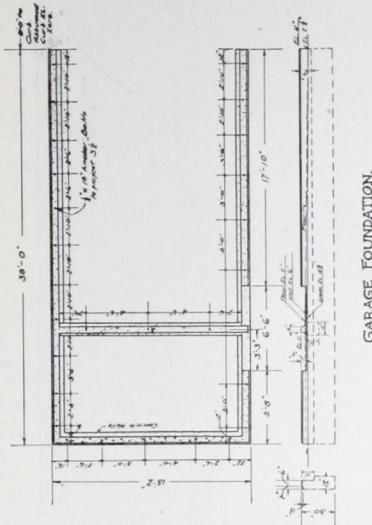
If a still cheaper method is desired, the framework of the building may be constructed of wood, 2 x 4 wooden studs 16 inches on centers with bridging between being used in place of the pipe or angle iron frame. Staple the metal lath on to the wooden studs, but have the stapling loose to allow a certain amount of play between the lath and the stud.

Use two coats of stucco on the outside and apply one coat inside between the 2 x 4 studding. A neater appearing interior can be had, and the garage made more fireproof by lathing and stuccoing the interior in the same manner as the exterior, but in place of making a rough finish the finished coat should be floated smooth.

Detail drawings of a wood stud garage are shown on page 27 and a photo on page 24. The cost of this garage completed was \$783.80.

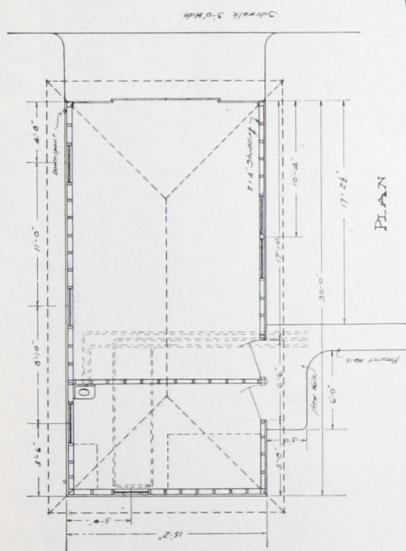


Garage at Far Rockaway, L. I., N. Y. Stucco on Wood Frame and Metal Lath.



GARAGE FOUNDATION.

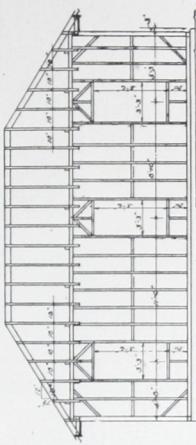
SCALE $\frac{1}{8}$ INCH = 1 FT.



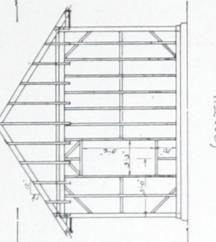
PLAN

GARAGE.

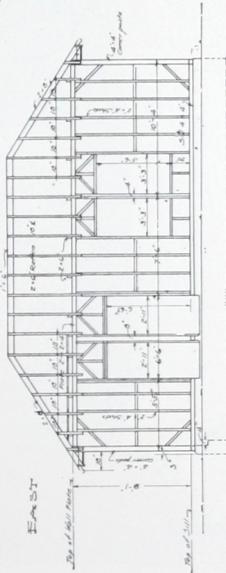
SCALE $\frac{1}{8}$ INCH = 1 FT.



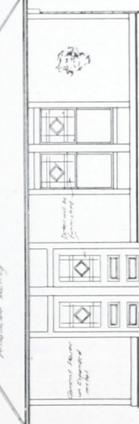
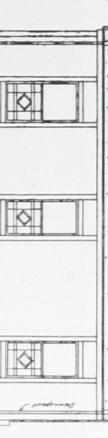
FRONT ELEVATION.
Scale $\frac{1}{8}$ inch = 1 ft.



SIDE ELEVATION.

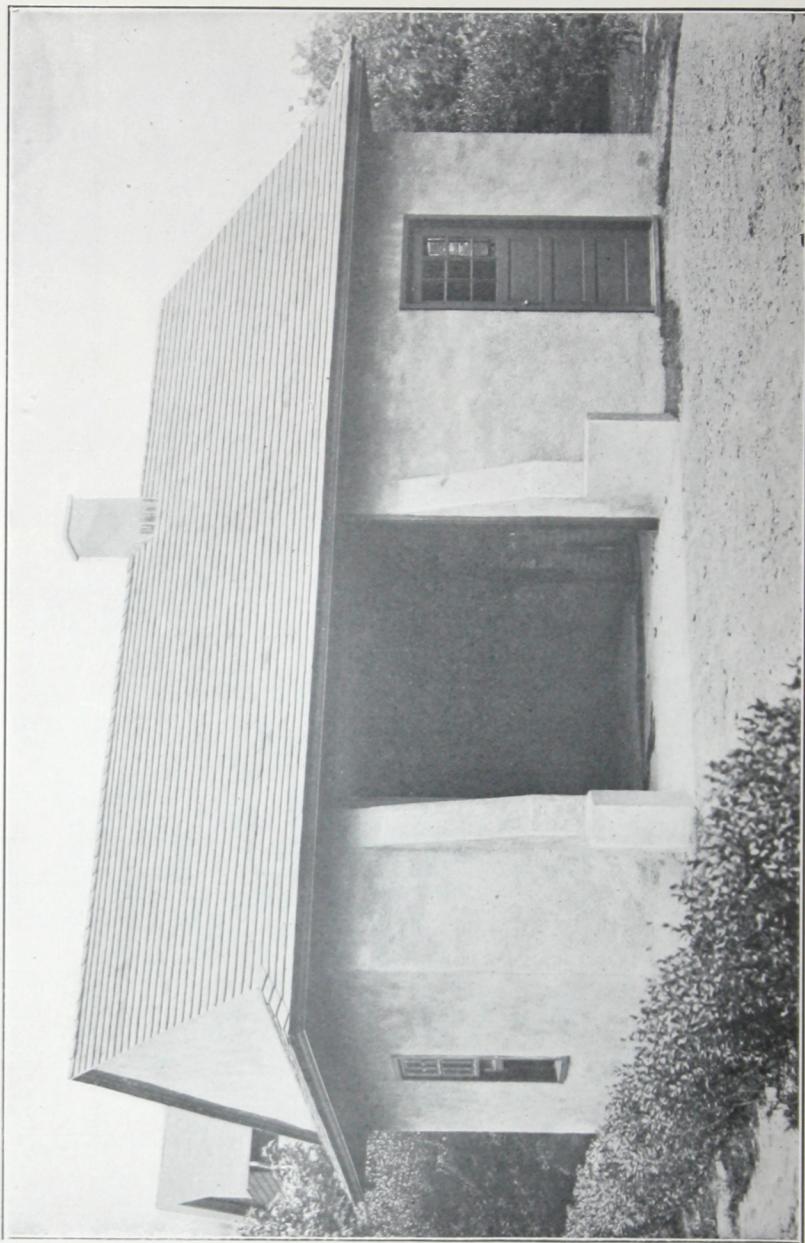


REAR ELEVATION.
Scale $\frac{1}{8}$ inch = 1 ft.



WEST ELEVATION.
Scale $\frac{1}{8}$ inch = 1 ft.

Detail of Garage Shown on Page 24.



Garage at Woodmere, L. I., N. Y. Stucco on Brick.

GARAGE FLOORS.

Garage floors should be laid the same as sidewalks, detailed specifications for which are given in our book "Concrete Construction about the Home and on the Farm," copies of which may be had free upon request.

SPECIFICATIONS FOR STUCCO.

The instructions given below should be closely followed in building any of the garages described in this book.

"Stucco work may be used to cover wood, brick, stone or any other building material, provided special precautions are taken in preparing the surface properly so that it will adhere and not crack or scale off. The work should be done by an experienced plasterer.

"As a rule, two coats are used—the first, a scratch coat composed of five parts 'ATLAS' Portland Cement, twelve parts clean, coarse sand, and three parts slaked lime putty and a small quantity of hair; the second, a finishing coat composed of one part 'ATLAS' Portland Cement, three or even five parts clean, coarse sand and one part slaked lime paste. Should only one coat be desired the finishing coat is used. Some masons prefer a mortar in which no lime is used, but this requires more time to apply.

"To apply stucco to brick or stone or concrete, clean the surface of the wall thoroughly, using plenty of clean water so as to soak the wall. If the surface is concrete roughen it by picking with a stone axe. Plaster with a $1\frac{1}{2}$ -inch coat and finish the surface with a wood float, or to make a rough surface cover the float with burlap. Protect the stucco work from the sun and keep it thoroughly wet for three or four days; the longer it is kept wet the better.

"In using stucco on a frame structure, first cover surface with two thicknesses of roofing paper. Next put on furring strips about one foot apart, and on these fasten wire lathing. (There are several kinds, any of which are good.) Apply the scratch coat $\frac{1}{2}$ -inch thick and press it partly through the openings in the lath, roughing the surface with a stick or trowel. Allow this to set well and apply the finishing coat $\frac{1}{2}$ inch to 1 inch thick. This coat can be put on and smoothed with a wooden float, or it can be thrown on with a trowel or large stiff-fibred brush, if a spatter-dash finish is desired. A pebble-dash finish may be obtained with a final coat of one part of 'ATLAS' Portland Cement, three parts coarse sand and pebbles not over $\frac{1}{4}$ inch in diameter, thrown on with a trowel."

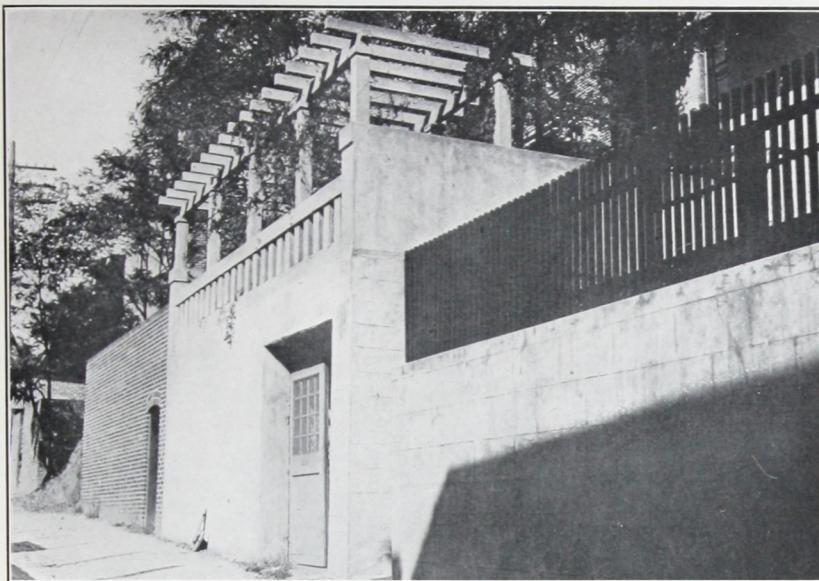
Quoted from copyrighted book "Concrete Construction about the Home and on the Farm," page 156.



Solid Concrete Garage, New York City.



Solid Concrete Garage, Newton, Mass.



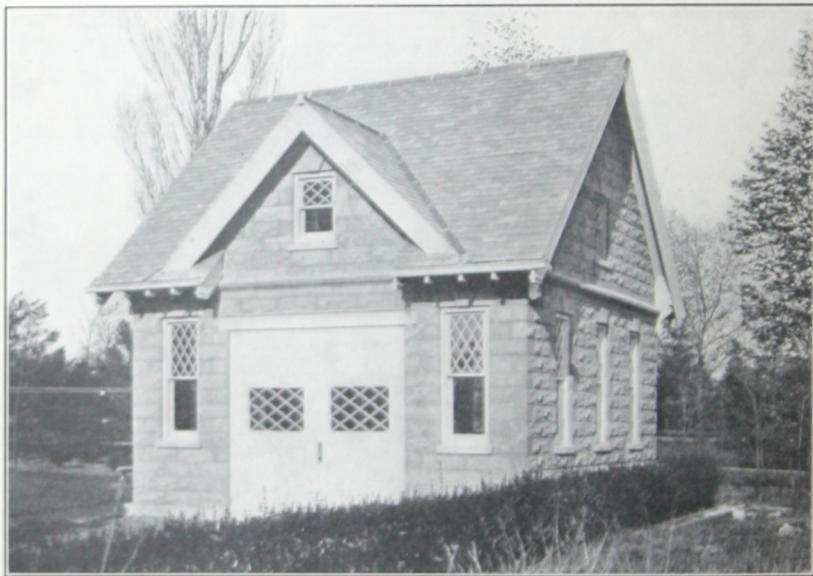
Solid Concrete Garage Built in Wall, Washington D. C.



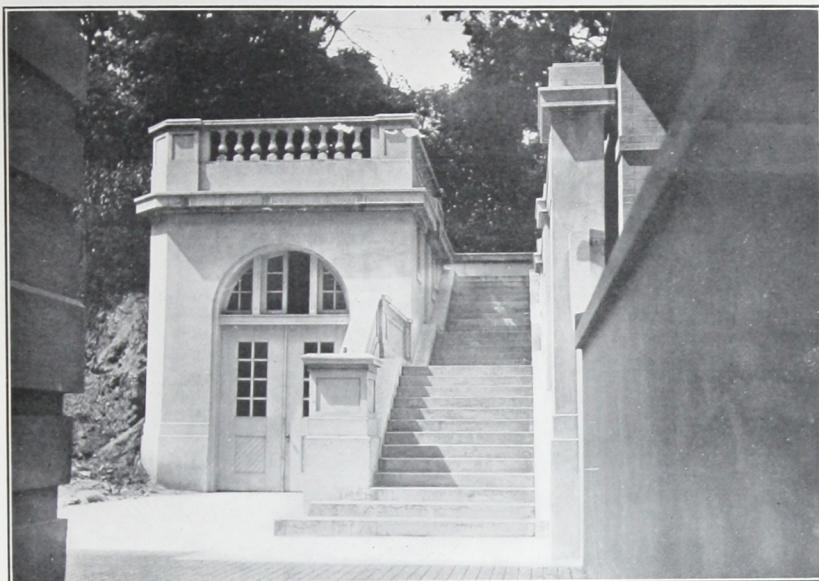
Solid Concrete Garage, Marblehead, Mass.



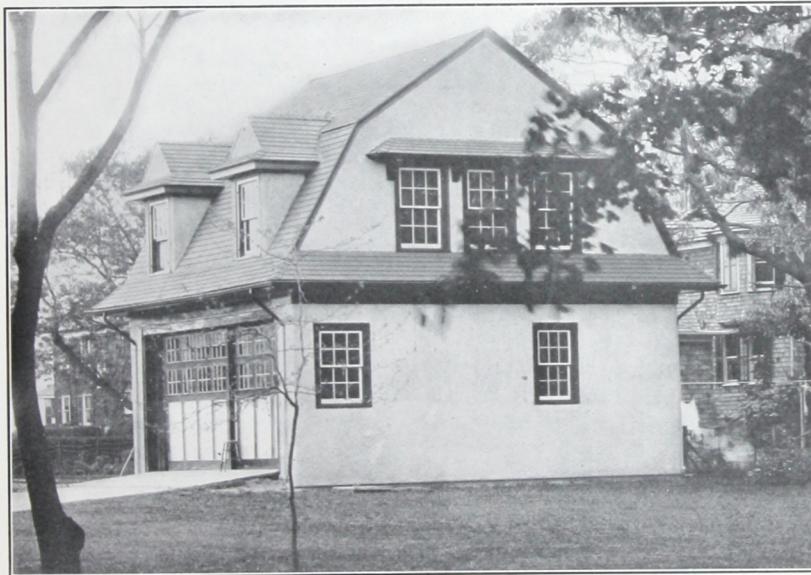
Concrete Block and Stucco Garage, Haworth, N. J.



Concrete Block Garage, Paterson, N. J.

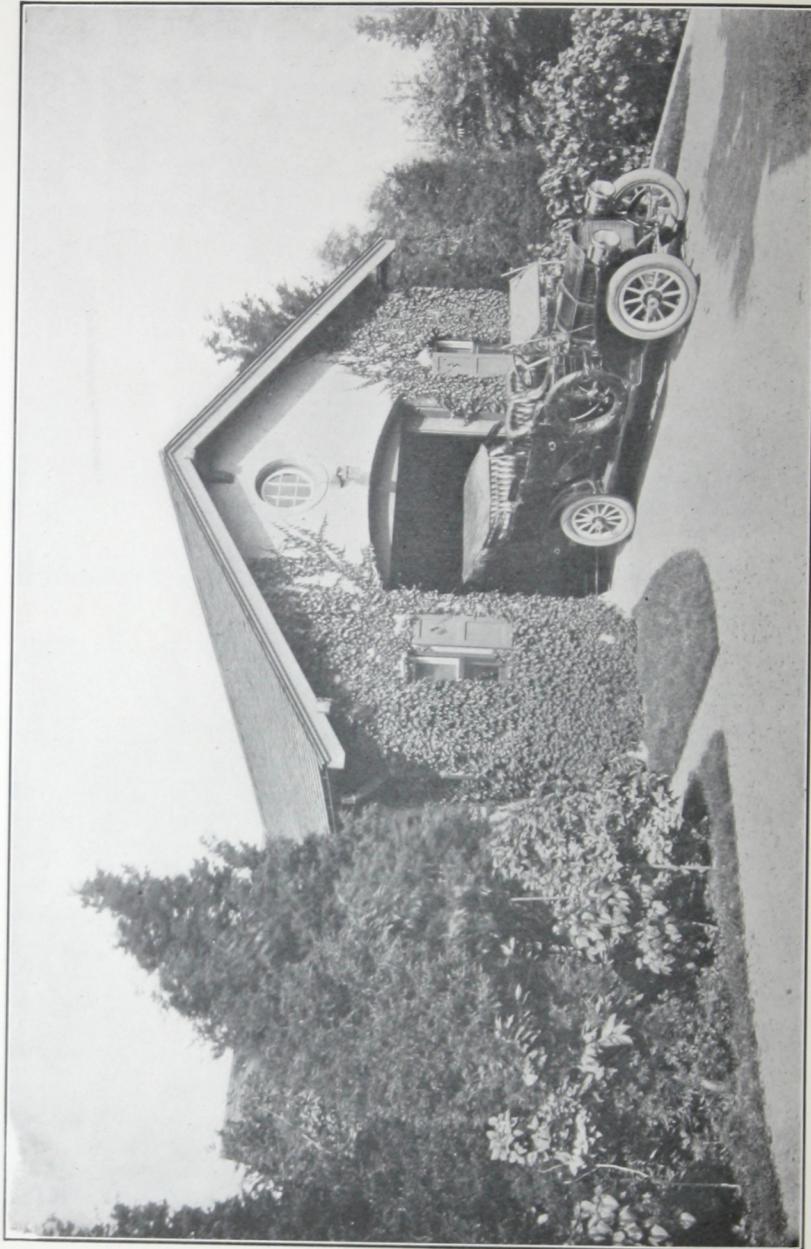


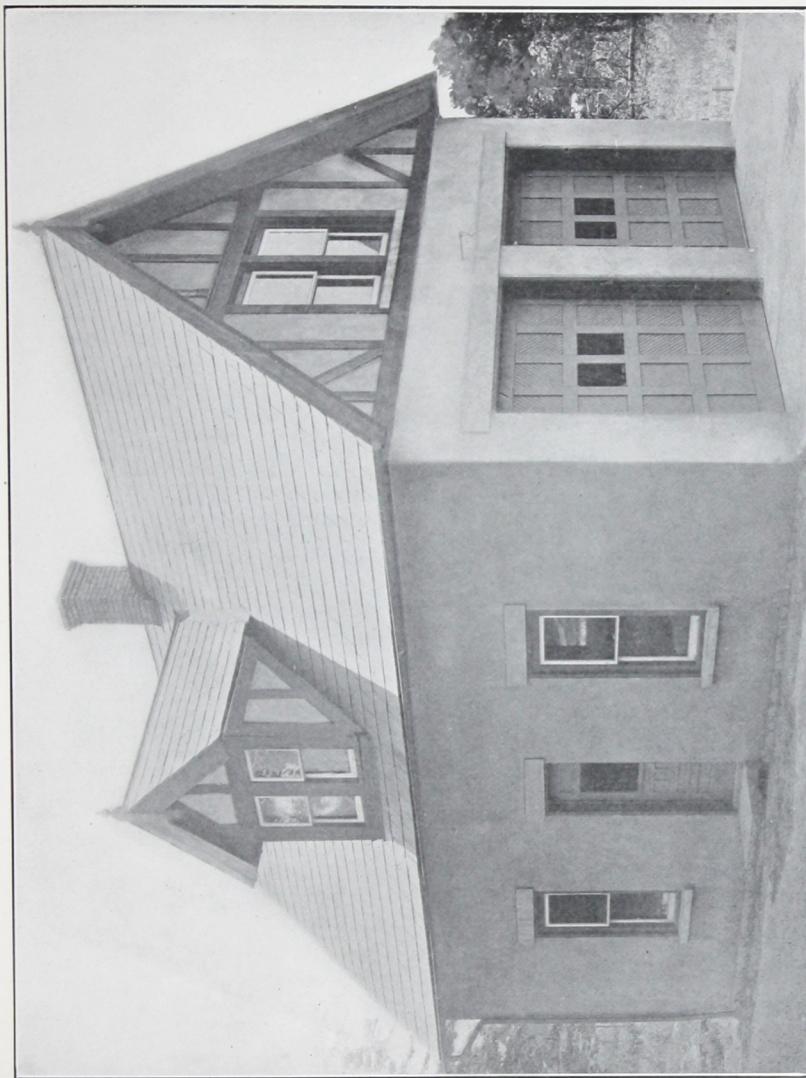
Concrete Garage Adjoining Residence, Washington, D. C.



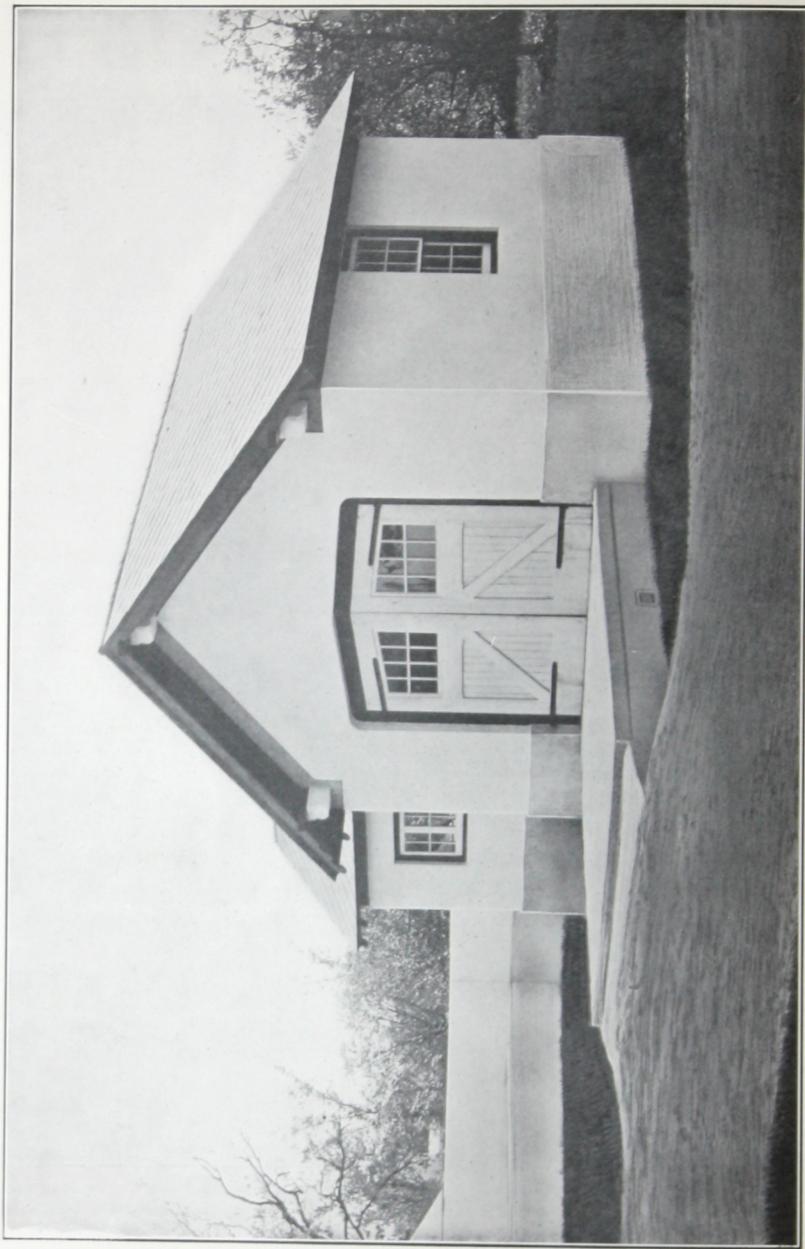
Stucco Garage, Far Rockaway, L. I.

Garage at Cohasset, Mass. Stucco on Wood Frame and Metal Lath.

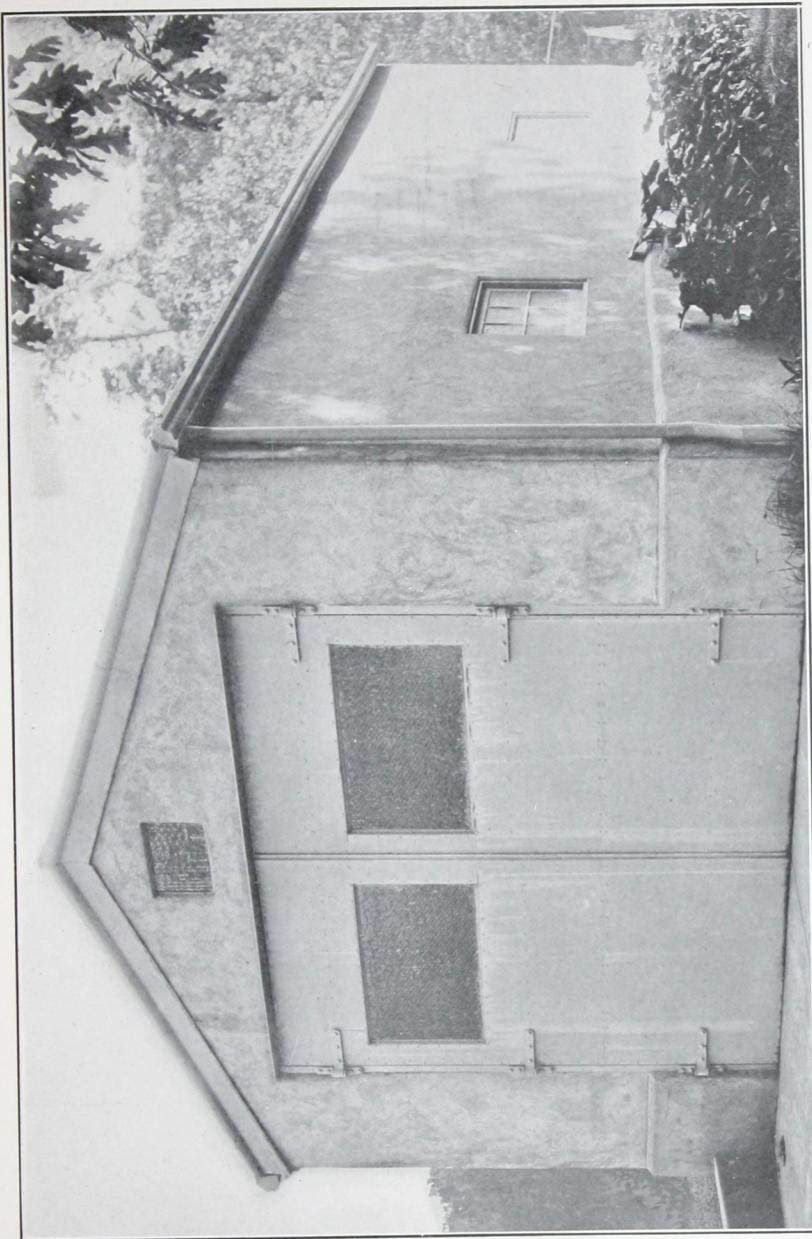




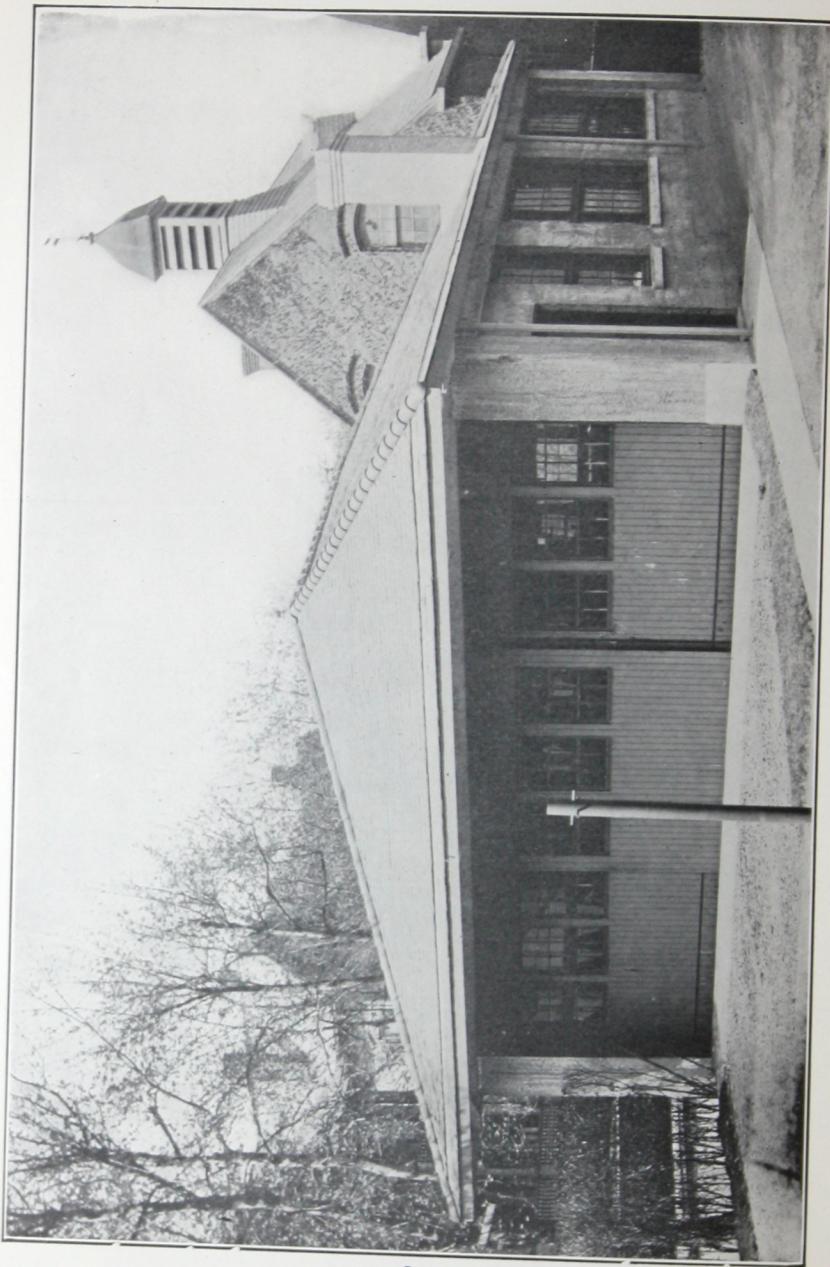
Garage at Youngstown, Ohio. Stucco on Concrete Tile.



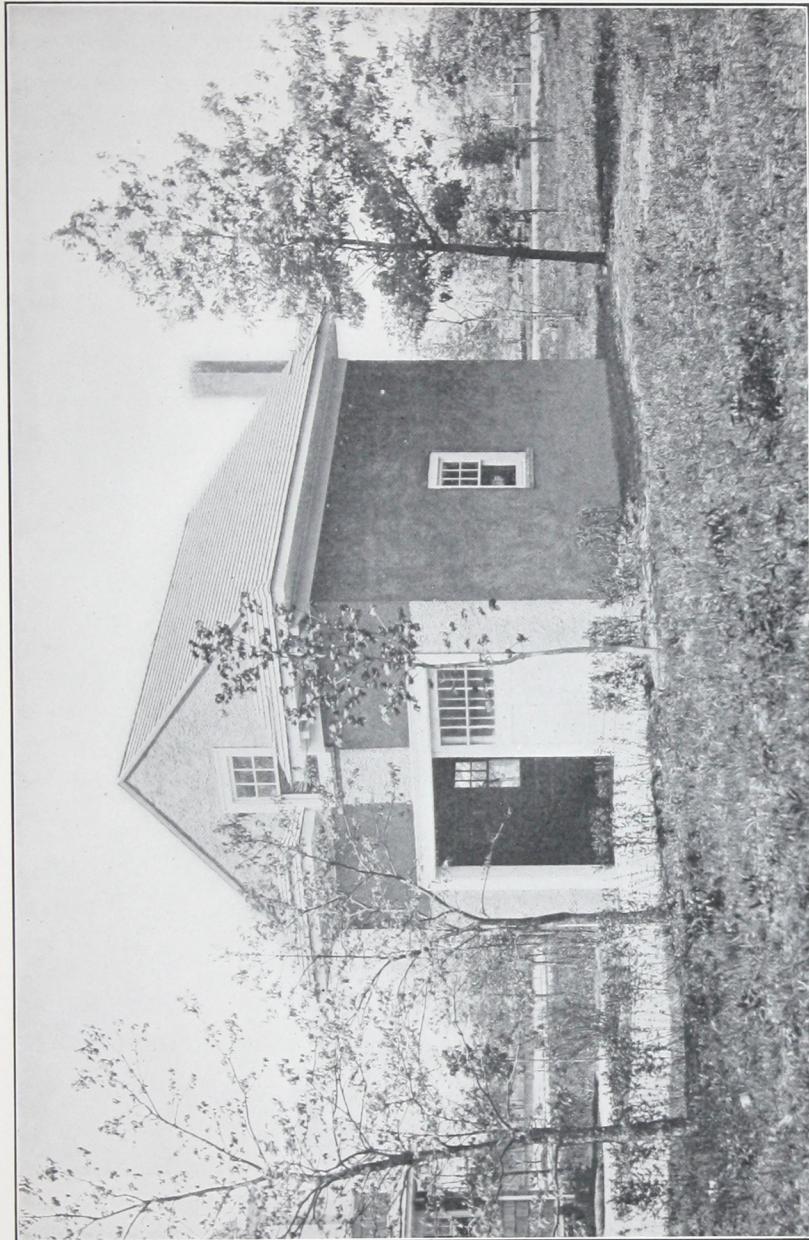
Garage at Islip, L. I., N. Y. Solid Reinforced Concrete.



Garage at Summit, N. J. Solid Reinforced Concrete.



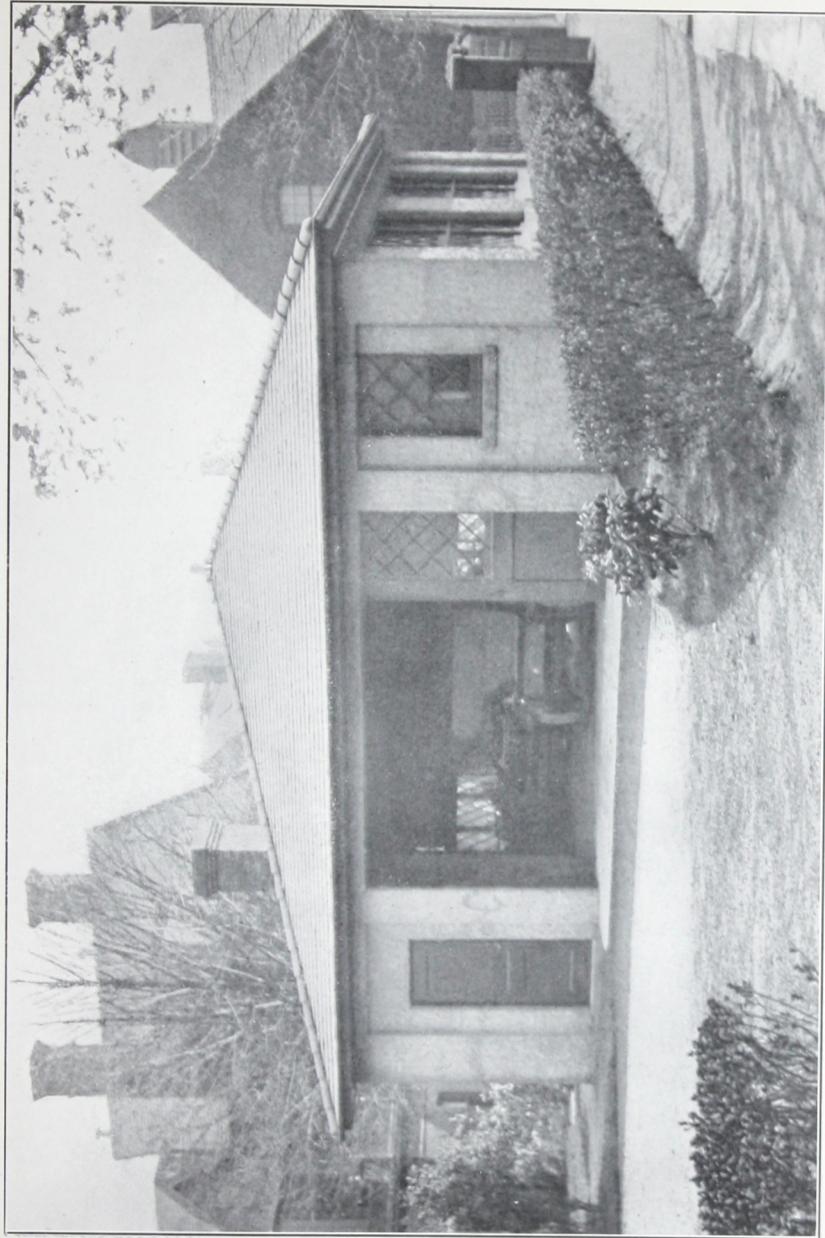
Garage at Paterson, N. J. Solid Concrete.



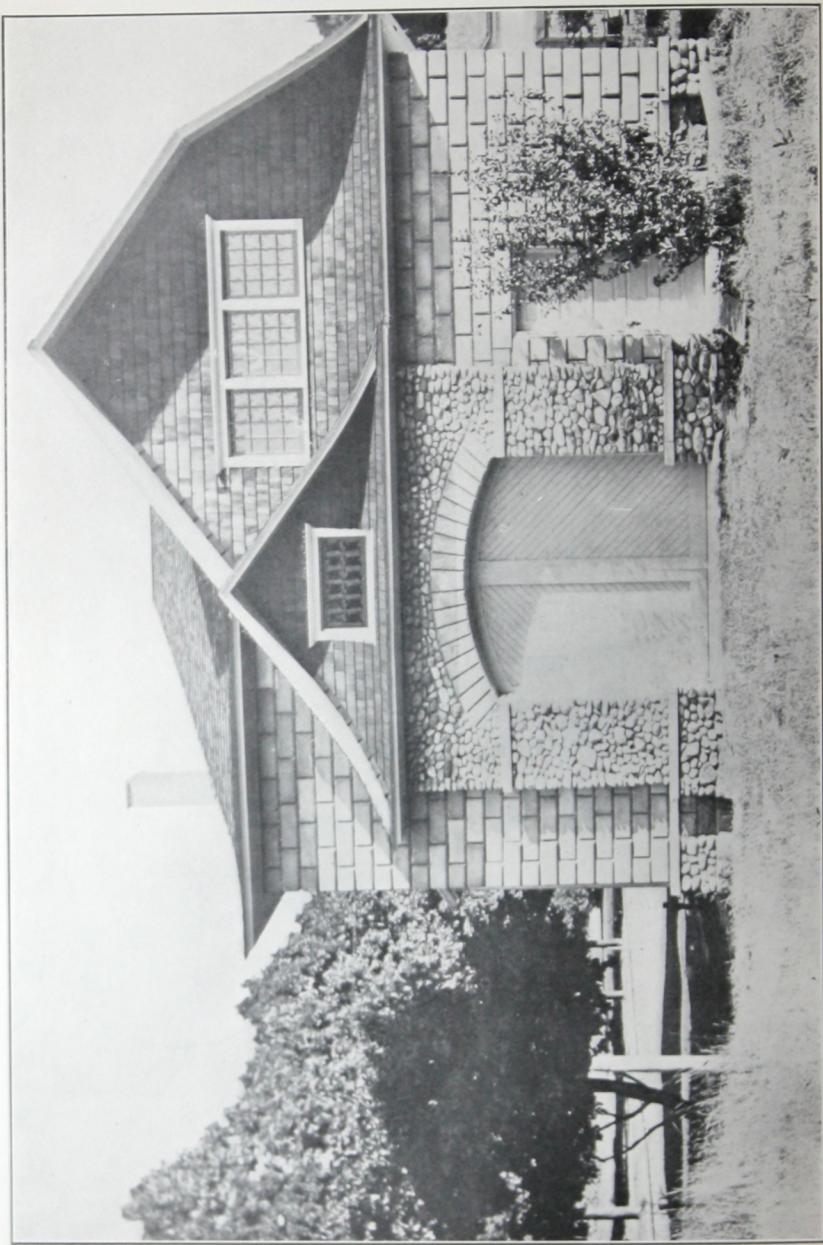
Garage at Woodmere, L. I., N. Y., Stucco on Concrete Block.

Garage at Black Rock, Conn. Solid Reinforced Concrete.

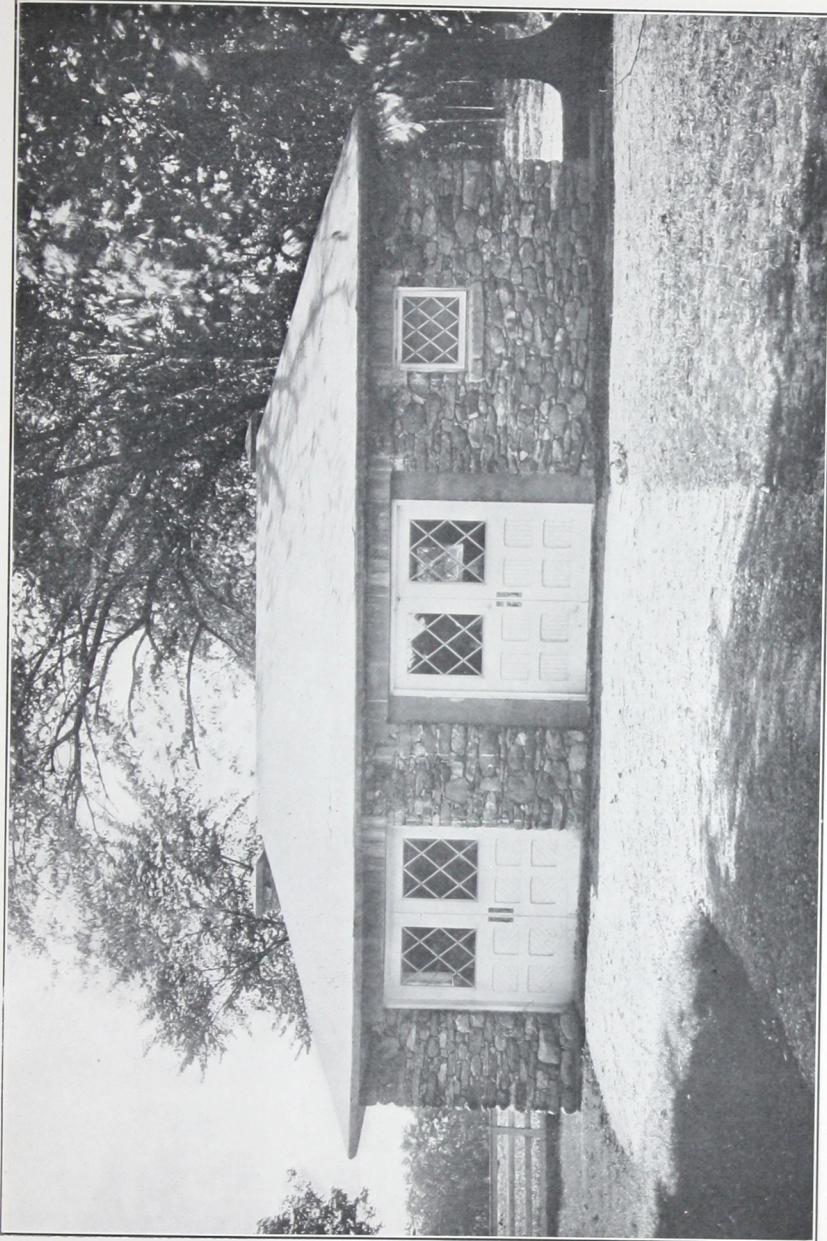




Solid Concrete Garage, Paterson, N. J

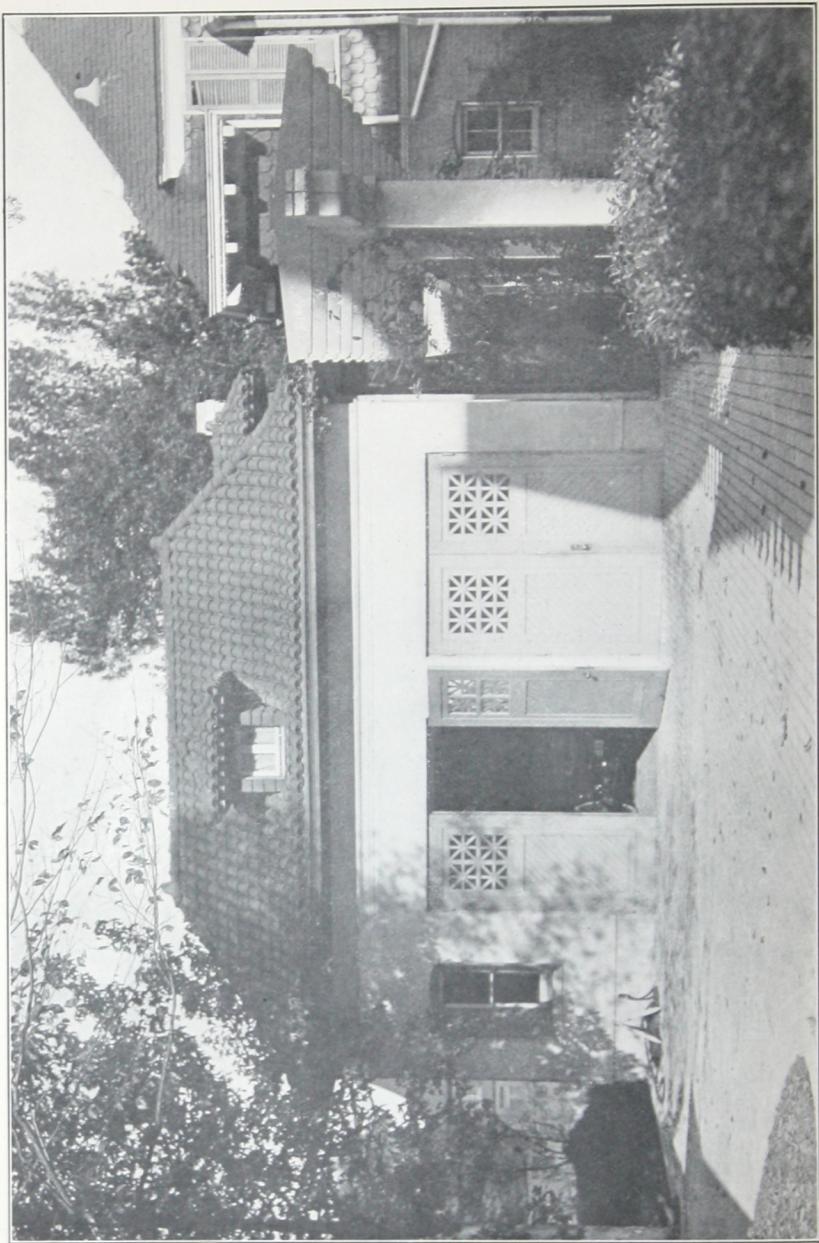


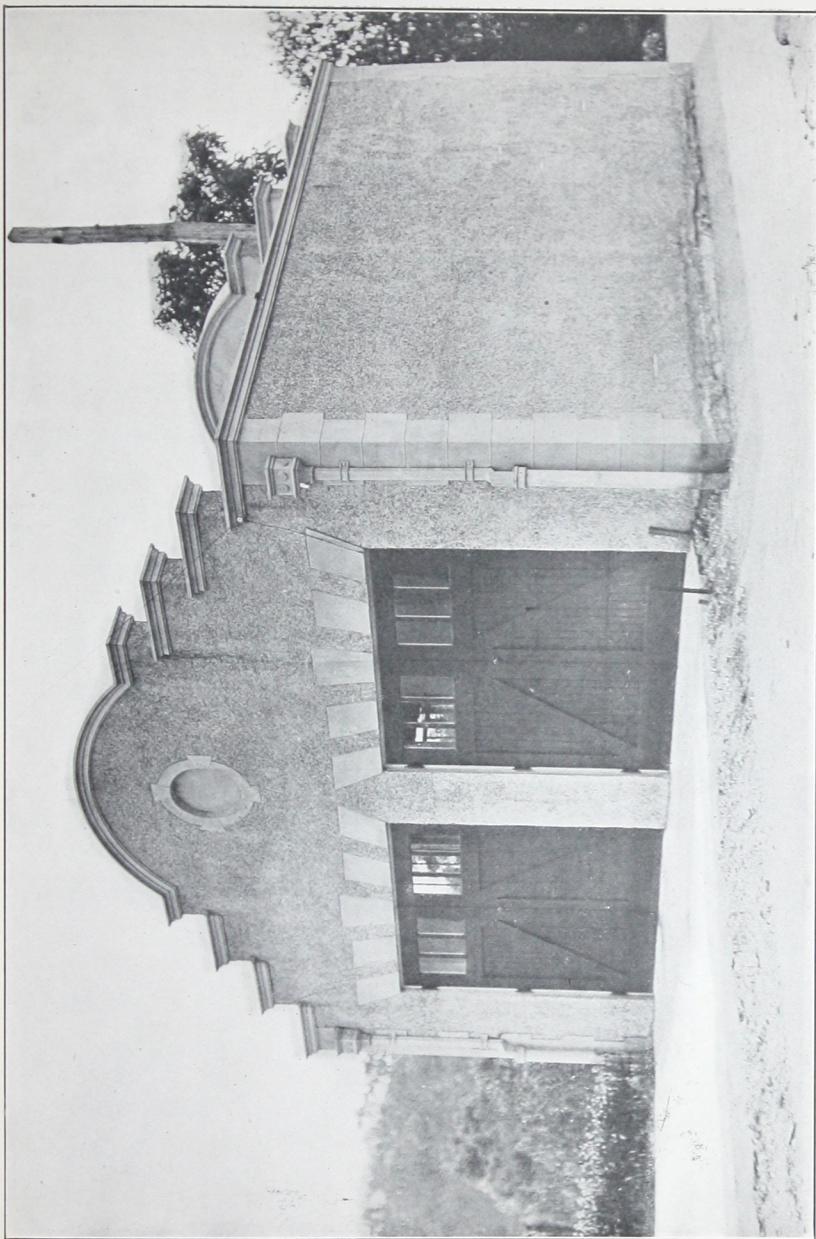
Concrete Block Garage, Frankfort, Mich.



Rubble Concrete Garage, Tarrytown, N. Y.

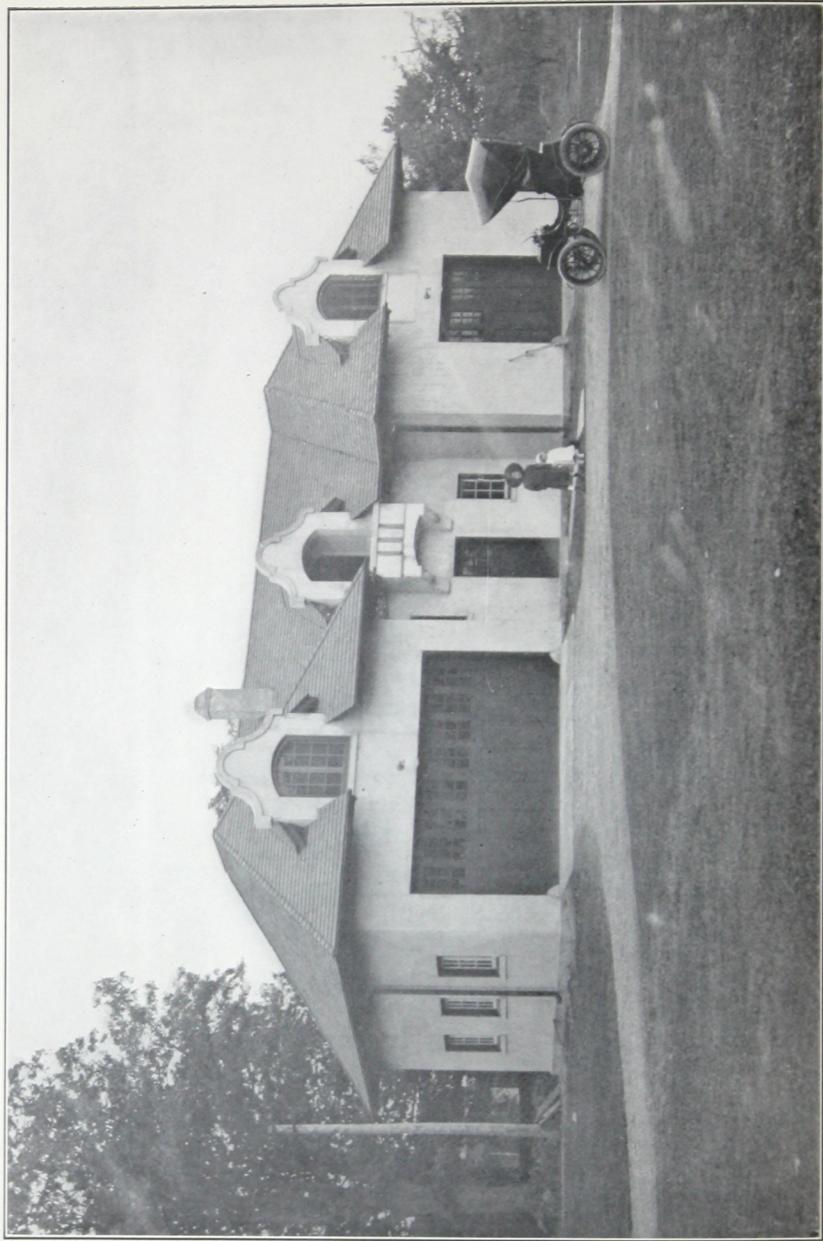
Solid Concrete Garage, Washington, D. C.

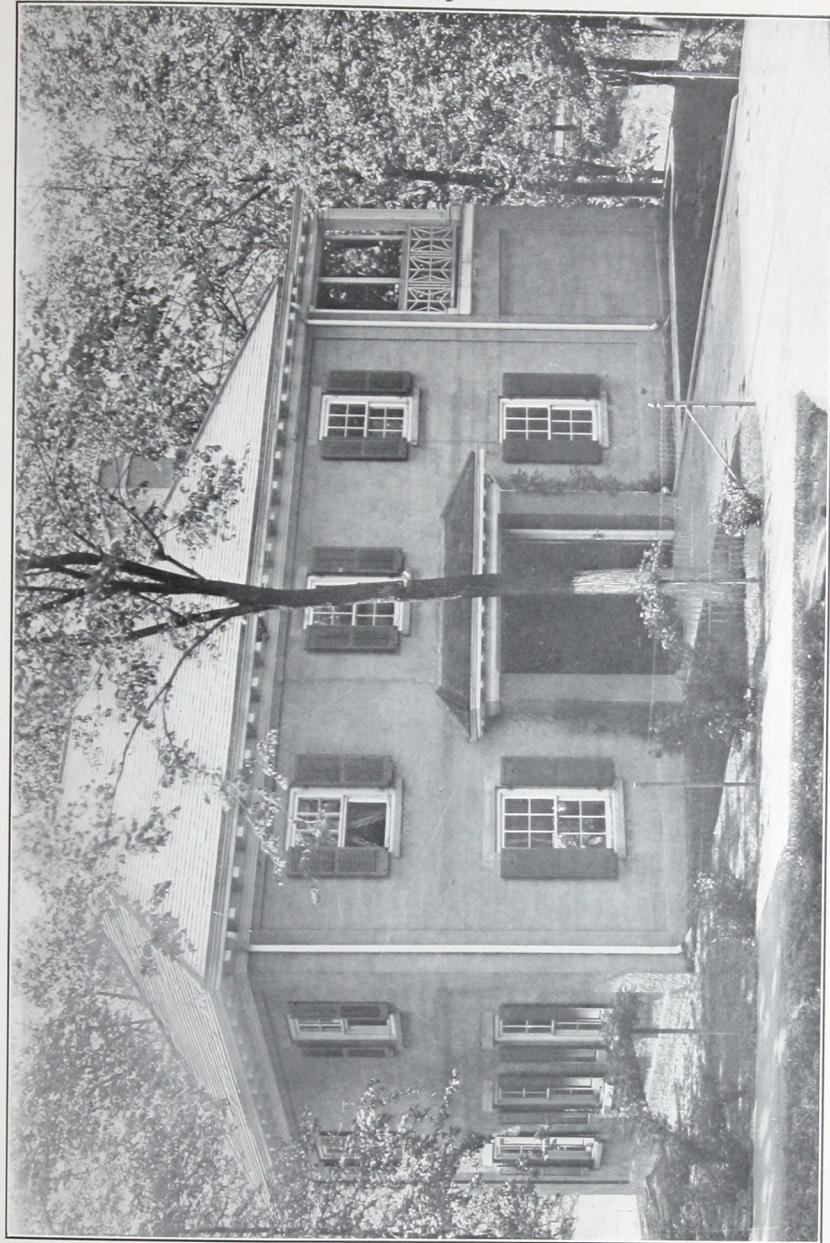




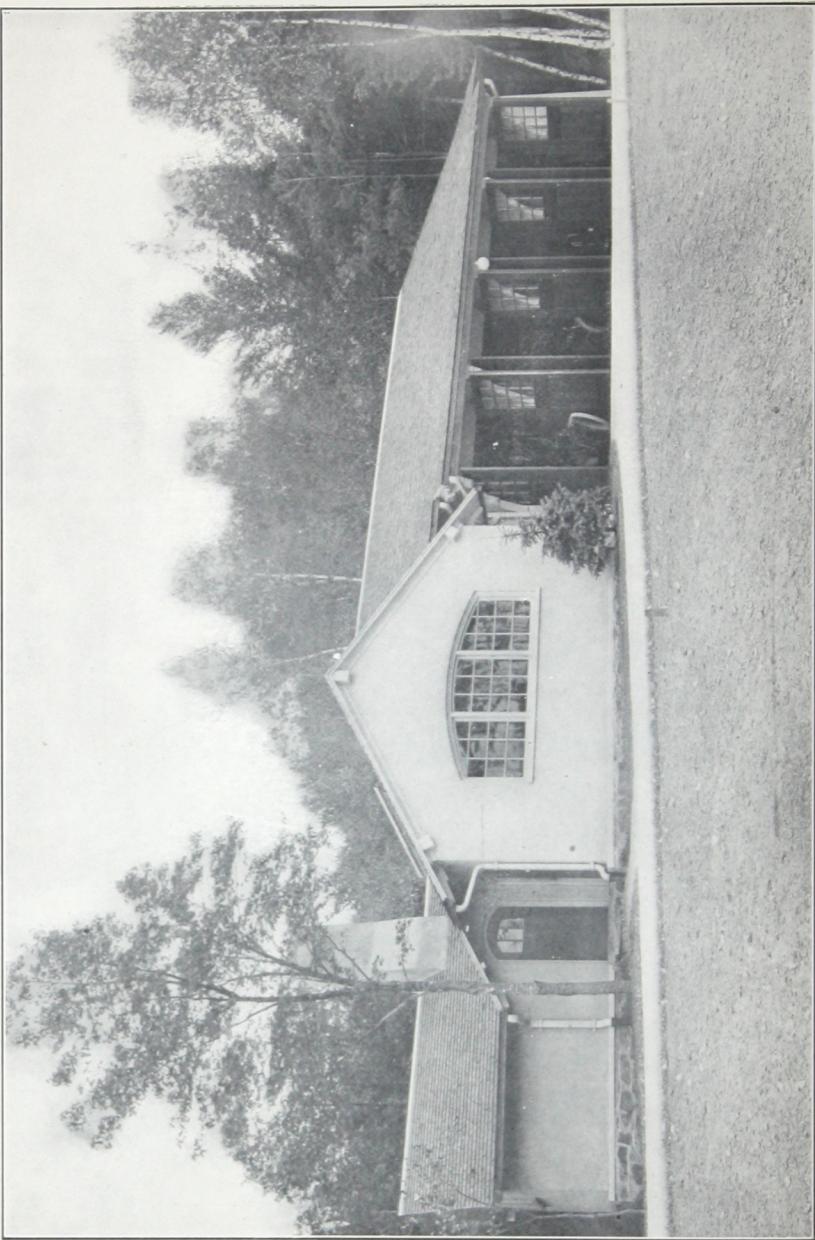
Solid Concrete Garage for Two or Three Cars, Washington, D. C.

Stucco Garage, Rochester, N. Y.

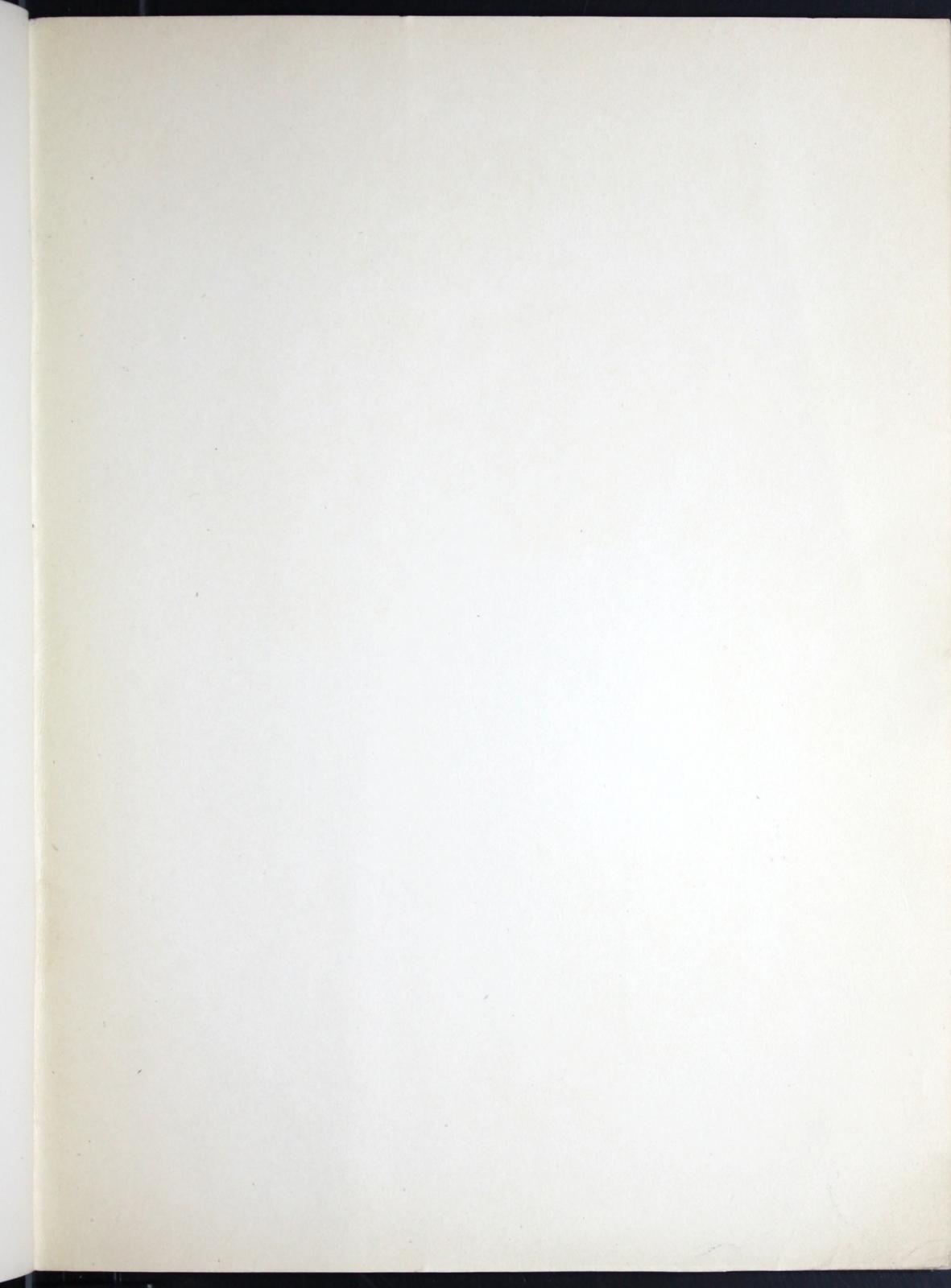




Concrete Block and Stucco Garage, Summit, N. J.

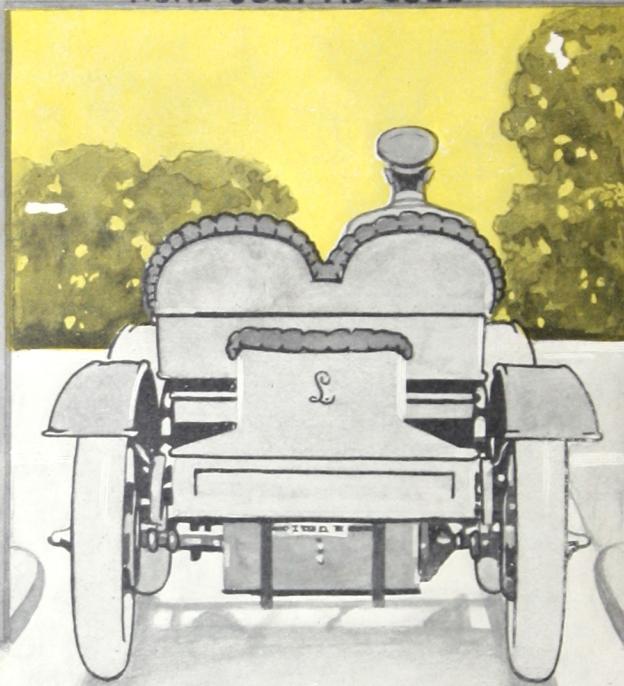


Concrete Garage for Four Cars, with Chauffeur's Residence.





NONE JUST AS GOOD



ATLAS - the cement bought by
United States Government for Panama Canal